REPORT RESUMES

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THE ROLE OF EDUCATIONAL RESEARCH IN EDUCATIONAL CHANGE, THE UNITED STATES.

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FIVE MAJOR TYPES OF ORGANIZATIONAL SETTINGS FOR EDUCATIONAL RESEARCH ARE IDENTIFIED BY S.D. SIEBER--(1) UNIVERSITY BASED, (2) REGIONAL EDUCATIONAL LABORATORIES, (3) STATE DEPARTMENTS OF EDUCATION, (4) LOCAL SCHOOL SYSTEMS, AND (5) PRIVATE TESTING AND RESEARCH ORGANIZATIONS. FOUR PROBLEM AREAS RELATED TO EACH SETTING ARE DEALT WITH BY N.L. GAGE--(1) THE EXTENT TO WHICH RESEARCHERS ARE FREE TO INITIATE RESEARCH RATHER THAN TO CONFORM TO AN ORGANIZED PROGRAM OF RESEARCH, (2) THE BALANCE BETWEEN PURE AND APPLIED RESEARCH, (3) THE RELATIONSHIP OF RESEARCH INSTITUTIONS TO UNIVERSITIES, AND (4) THE EXTENT TO WHICH INTERDISCIPLINARY RESEARCH CAN BE CARRIED OUT. THE RECRUITMENT AND TRAINING OF EDUCATIONAL RESEARCHERS IN THE UNIVERSITIES IS DESCRIBED BY J.E. HOPKINS. T.D. CLEMENS DISCUSSES FUTURE RESEARCH DISSEMINATION BY A GROUP OF MUTUALLY SUPPORTING, RESEARCH INFORMATION SYSTEMS GROWING OUT OF PRIVATE AND PUBLIC RESOURCES. THE PROBLEM OF CONVERTING EDUCATIONAL RESEARCH INTO PRACTICE AND INNOVATION IS APPROACHED BY H.M. BRICKELL. CONTEMPORARY EDUCATIONAL RESEARCH IS CHARACTERIZED BY E.G. GUBA AND J.J. HORVAT AS A PART-TIME PURSUIT WHICH IS LOOSELY ORGANIZED, UNIVERSITY BASED, INDIVIDUALLY DIRECTED, THEORY ORIENTED, COMMITTED TO EXPERIMENTATION, CONDUCTED BY PERSONS TRAINED IN A PSYCHOSTATISTICAL TRADITION, FEDERALLY FUNDED, UNDERSTAFFED, AND UNDERFUNDED. OTHER PROBLEMS OF CONCERN INCLUDE LACK OF RESEARCH UTILIZATION BY PRACTITIONERS, INADEQUATE RESEARCHER-PRACTITIONER LINKAGE MECHANISMS, INADEQUATE TRAINING OF EDUCATIONAL RESEARCHERS, AND SHORTAGE OF TOOLS AND STRATEGIES FOR CARRYING OUT IMPROVEMENT. POSSIBLE CORRECTIONS FOR THE ABOVE CONDITIONS INCLUDE THE REDESIGNING OF EXISTING RESEARCH STRUCTURES, THE DEVELOPMENT OF NEW RESEARCH STRUCTURES TO COMPLEMENT EXISTING STRUCTURES, AND THE BUILDING OF LINKAGE MECHANISMS AND TRAINING PROGRAMS. THIS DOCUMENT WAS PREPARED FOR PRESENTATION AT THE CONFERENCE ON THE ROLE OF EDUCATIONAL RESEARCH IN EDUCATIONAL CHANGE (UNESCO INSTITUTE FOR EDUCATION, HAMBURG, GERMANY, JULY 19-22, 1967). (GB)

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THE UNITED STATES

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THE UNITED STATES

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INTRODUCTION

The task of describing the patterns of educational research in the United States and their relationship to educational change is unbelievably complex. The variety of research organizations and institutes, the large number of agencies engaged in research training activities, the many channels of communication of research data, and the recent proliferation of agencies concerned with relating research to practice render it most difficult for any one authority to be knowledgeable about every facet of the research enterprise. Accordingly the various sections of this paper have been drafted by individuals who can claim special competence in the subject treated.

Section I, Institutional Setting, was developed by Sam D. Sieber, well known for his work in conjunction with Paul Lazarsfeld on the organizational aspects of educational research. Their two books, Organizing Educational Research (Lazarsfeld and Sieber, 1964) and The Organization of Educational Research (Sieber and Lazarsfeld, 1966) are acknowledged as the outstanding scholarly works in this area. Section II, Problems Associated with the Organization of Research Institutes, was written by N. L. Gage, who as the Director of the Stanford Research and Development Center and as a former president of the American Educational Research Association is well qualified to comment on these problems. Section III, Recruiting and Training of Staff, by John E. Hopkins, draws, from among other sources, on the data developed by Hopkins and David L. Clark in a United States Office of Education sponsored study on traditional and emergent roles of research and research-related personnel

(Clark and Hopkins, 1967). Section IV, Dissemination of Research Results, has been prepared by Thomas D. Clemens, Deputy Director of the Division of Research Training and Dissemination, United States Office of Education, who has had a long association with dissemination activities and funding programs of that office. Section V, The Role of Research in the Innovation Process, was written by Henry M. Brickell, whose work on Organizing New York State for Educational Change (Brickell, 1961) has become the standard reference in this country for the practitioner seeking assistance in implementing programs of planned educational improvement. Finally, Section VI, Interpretation, was prepared by Egon G. Guba and John J. Horvat, Director and Executive Officer, respectively, of the National Institute for the Study of Educational Change, an agency concerned with the development of adequate conceptual bases for educational improvement activities.

I. INSTITUTIONAL SETTING[1]

The research structures in the United States that relate to education are so numerous and diversified that it is impossible to speak with unassailable authority about their current activities and organizational patterns. A recent, highly detailed study of educational research units (Sieber and Lazarsfeld, 1966) covers only those units located in graduate schools of education. Less extensive studies have also been made of the organization for research in state departments of education (Bean, 1965) and in local school systems (Educational Research Service, 1965). So far as is known, comparable studies have not been undertaken of the research agencies outside of the universities. A few case studies of the relatively new research and development centers, supported by the U. S. Office of Education, have been prepared by social scientists, but no effort at systematic investigation of all these centers has yet been launched. Industrial research developments related to educational technologies are so recent that it is especially difficult to acquire a coherent picture of events taking place in this sector; accordingly this sector is omitted from the present discussion. In short, the following description of current educational research structures and activities will be based on information ranging in nature from systematic data reported in nationwide surveys to impressionistic observations based on scattered accounts.

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[1] This section was contributed by Sam D. Sieber, Research Associate, Bureau of Applied Social Research, Columbia University.

There are five major types of organizational settings for educational research in the United States (excluding industry): (1) university-based research units, including bureaus in schools of education, bureaus in other departments of the university, inter-departmental research and development centers, and projects spanning several universities; (2) regional educational laboratories; (3) research units that are either wholly or partially supported by state departments of education; (4) research units operated entirely by local school systems; and (5) private testing and research organizations which are relatively independent of universities and of local or state school systems.

University Research Units

Graduate schools of education. The founding of research bureaus in professional schools of education dates from the second decade of the century. Established mainly in response to the demand for greater "efficiency" in school management, the first educational research bureaus in schools of education invested their energies in surveys of school finances and facilities, the development and scoring of tests, and other related school services. As these activities became routinized they were taken over by state departments, local school systems, and private testing agencies. The bureaus, therefore, gradually shifted attention to more basic types of inquiry. Thus, whereas all of the fifteen university bureaus existing in 1927 were involved in testing of school children, less than half were so involved in the late 'forties, and today only about five per cent engage in testing (Sieber and Lazarsfeld, 1966). As shall be indicated below, however, many of the present bureaus of educational research still provide some type of service for school systems in addition to carrying out research.

The past ten years has witnessed a great burgeoning of these small educational research units in schools of education. Out of an estimated number of 70 research units operating today, about 25 per cent were founded since 1960. The proportionate increase since 1949 has been 68 per cent. The major impetus for this trend has been the increasing availability of federal funds for research on education, specifically as a result of the Cooperative Research Program of the U. S. Office of Education inaugurated in 1956. In fiscal 1957, $1 million was allocated for educational research under this program; by fiscal 1963 the figure had climbed to almost $7 million; and since the passage of the Elementary and Secondary Education Act in 1965, federal appropriations for research and development have risen to $70 million annually.

About a third of these research units specialize in one area of research, such as educational administration, talent or creativity, special education, and comparative education. The remainder conduct research on a variety of topics. Overall, the areas that are most commonly researched are: tests and measurements, methods of instruction, educational administration, reading, and psychology of learning. The research programs within the units are distinguished from individual faculty projects by greater attention to large-scale, empirical, social research on less traditional topics. Projects located outside of these units are more often concerned with psychological research and library research. It should be borne in mind, however, that not all of the resources of these units are devoted to research, as distinguished from school services such as individual consultation, implementation of new practices, workshops and conferences for local schools, and school surveys of personnel, plant, and financial needs. Only about a third of the units are exclusively concerned with research; two-thirds devote more than half of their budget to research, while the remainder devote more than half to services.

On the average, there are about 21 research personnel associated with each unit. The majority are professional persons, while the remainder are graduate research assistants. Most of the professional personnel (8 per unit) are non-staff faculty members whose research is facilitated by the unit. Thus, there is a large body of researchers in schools of education who seek the facilities and expertise of these units without becoming regular staff members. On the average about a quarter of the professional staff have been recruited from behavioral science departments outside the school of education.

Leadership of these bureaus is provided by a Director, who is often assisted by an administrative officer, and by advisory committees or councils comprised most often of education faculty members, university administrators, and the Director himself. The responsibilities of these committees are usually advisory rather than supervisory in nature. The crucial tasks of recruitment, program-planning, consultation on proposals, judgment of the staff's quality of work, and communication with the university administration are in the Director's domain. Other important activities of Directors are seeking funds for research and budgeting for the unit as a whole.

The presence of teams, of non-educators, and of graduate students in these units points to a unique social function of research bureaus: the integration of skills, of disciplines, and of functions. In view of the excessive amount of organizational differentiation which has emerged in American universities, it needs to be appreciated that research units are furnishing higher education with an important mechanism for reunification.

Behavioral science departments outside of education. Another type of research organization in the universities that carries on research related to education is found in the liberal arts departments, especially sociology, psychology, and social psychology. Because a definitive study of these research organizations remains to be mounted, it is impossible to specify what proportion of these units are doing research on education. It is clear that this proportion is significantly large as a consequence of recently developed interest in education as a field of investigation. These units are organized in patterns that are very similar to those in the professional schools of education, with the exception that only a portion of their work is focussed on education. The Bureau of Applied Social Research, Columbia University, presents an illustrative case.

Closely affiliated with the graduate department of sociology, this organization contains six research programs, each of which is under the supervision of a program director. One of these programs is concerned with education. The educational research program emerged quite gradually as discrete studies related to education were undertaken over a period of several years. Funds from the U. S. Office of Education for research training have recently made it possible to conduct a research training program. Research projects have covered: school-community relations, professional socialization of physicians, lawyers, and musicians, the effectiveness of educational television for medical practitioners, the role of school boards, the organization of educational research in the nation, faculty-student relations in college, and the admissions process in higher education. Organizations such as the Bureau of Applied Social Research are devoted to basic research on education, and therefore neither provide services to school systems nor engage in the development of educational practices. For the most part, their connections with school systems are established for the sole purpose of research.

Inter-departmental research and development centers. The integrative function of research organizations in the universities is revealed most clearly in the operation of the new research and development centers, which are supported mainly by federal funds authorized by Title IV of the Elementary and Secondary Education Act of 1965 (ESEA). Presently there are ten of these centers with federal funds averaging almost a million dollars annually. Each center focuses on a special education problem, such as cognitive learning, teacher education, individualization of instruction, educational administration, or higher education. Each center, on the average, contains 18 research or development projects, 68 professional researchers, 54 graduate assistants, and 18 other personnel. Thus, the contrast in size alone between the traditional bureaus of research and the new centers is quite striking.

Another contrast concerns the explicit emphasis of the centers on interdisciplinary work, which is sought by drawing upon the resources of several departments and professional schools within each university.

Other major differences concern the uniformly shared objective of inventing new educational practices on the basis of on-going research within the center, and field testing these innovations in school settings. The Learning Research and Development Center of the University of Pittsburgh, for example, has developed and tested a system of individually prescribed instruction. Similarly, a project at the Wisconsin Research and Development Center for Cognitive Learning has been testing the effectiveness of a sequencing of concepts in English language and composition, examining the relative effectiveness of programming techniques in the teaching of these concepts, conducting field tests of instructional and curriculum materials, and so forth. This developmental work is built upon research on concept learning conducted at the center.

The centers have explored various means of disseminating research and implementing change in schools, such as demonstrations, conferences, publications, and consultations. One of the centers is evaluating various arrangements within schools to induce continuing change. An example of one such arrangement is the R & I unit (research and instruction). This unit is designed to succeed team teaching and the self-contained classroom as a more flexible means of scheduling for instruction, while also providing for discovery and utilization of new practices. Another mechanism that has been tried out by the Wisconsin Center is the change-agent committee, which is system-wide in outlook rather than restricted to a particular school building, as in the case of the R & I unit. But with the recent establishment of the regional educational laboratories (to be described below) the centers are shifting responsibility for dissemination to these larger, inter-institutional agencies.

In sum, the R & D centers exhibit a conscientious effort to interrelate research, development, and practice. The developmental objective, incidentally, is combined with a de-emphasis on the provision of routine services to local schools. Although the centers have found it expedient to furnish short-range services in return for the cooperation of school personnel with the centers' research and field testing programs, such services are not regarded as part of the centers' missions. Finally, it should be mentioned that the training of future educational researchers is regarded as an important by-product of the centers' activities.

In all of these respects, the R & D centers depart substantially from the operating patterns of the traditional bureaus of research. The fundamental difference lies in enhancing the integrative function of research organizations. Thus, a variety of university departments, of specialties, and of functions (e.g., teaching and research, research and development) are combined. Also, the centers strive to relate the best intellectual traditions of higher education to educational practice, thereby pressing for the integration of academic and professional work. In short, the concept of the R & D center needs to be appraised in terms of an integrative impact on the sub-systems that comprise the realm of formal education in the United States.

Inter-university arrangements. A type of research arrangement that is encountered with increasing frequency consists of either a project or an organization spanning several universities. An arrangement of this kind is sometimes referred to as a "consortium."

Illustrative of an inter-institutional project is the Cooperative Project for Educational Development (COPED), supported by a contract with the U. S. Office of Education, which enlists the efforts of eight colleges and universities in developing strategies for effecting more rapid change in school systems. Collaboration among the participants in the various institutions is achieved through a representative executive committee that meets bi-monthly, through quarterly seminar-work conferences, and through task forces that focus on distinct aspects or phases of the project. Administrative coordination is provided by the National Training Laboratories of the National Education Association.

Regional Educational Laboratories

A new type of research organization authorized under Title IV of ESEA is the regional educational laboratory. These organizations are concerned less with the actual conduct of research than with putting the results of research into practice in local schools within a designated region. Development, field testing, dissemination, demonstration, and adoption activities are thus all relevant to their mission.

Perhaps the largest of these new laboratories is the Center for Urban Education (CUE), which was established in New York City by eight educational institutions in the area. CUE was the first of the twenty laboratories which are presently funded with federal support averaging $1 million annually.

The program of CUE is illustrative, but by no means an exhaustive depiction of the range of activities in which the laboratories are engaging.

It has, for example, prepared and tested new materials for language instruction, launched a pilot program in computer-assisted instruction, and carried out studies of the development of affect in children and its relation to cognitive growth. Many other projects are underway within CUE's four broad program divisions which are: the Division of Educational Practices (school administration, teacher training, and curriculum), the Division of Special Educational Practices (for severely handicapped children), the Division of Child Learning and Development, and the Division of Community Research (problems concerned with the relation between urban society and education).

An even more recent development is the founding of a national educational laboratory devoted to early childhood education. This new enterprise, which has received $1.5 million from the U. S. Office of Education, links together efforts of seven colleges and universities. Projects that are planned include: studies of language skills, forming of concepts, and physical coordination of two- and three-year-olds; development of curriculum for disadvantaged preschool and early primary grade youngsters; study of home environments; and examination of social segregation of four-year-olds in nominally integrated classrooms. The coordinative center is located at the University of Illinois, Urbana, Illinois. Since the organization is still in the planning stage, it is impossible to give details about operations.

Research Organizations in State Departments of Education

All of the fifty states conduct some operational research or furnish research service to personnel in the state government, in local school systems, or in the universities (Bean, 1965). Research services comprise the bulk of work in these agencies, and include consultation on proposals being developed by local school systems for federal or state funds, summaries of research or research opinion on special topics, consultation on research conducted by other divisions of the state department of education and by local school districts, coordination of university and state research efforts, screening of proposals from outsiders who desire access to schools, editorial assistance, and data-processing. Routine statistical services, which have increased markedly in recent years, are provided by special units or individuals in all of the state departments of education.

Most of the research conducted by the agencies themselves is social bookkeeping, such as studies of pupil drop-out rates, teachers' salaries, voting on school budgets and bond issues in local districts, and comparative college costs in the state. A prominent activity in a few states is evaluation of experimental school practices, such as the ungraded primary system, new reading instruction programs, educational television, special programs for lower class children, and so forth. Occasionally, evaluative surveys are conducted of entire school districts and of certain aspects of schooling throughout the state. The New York State Department of Public Instruction is probably most advanced in this respect.

Three-quarters of the states maintain units or persons whose primary responsibility is research. In most of these states, the senior research officer is directly responsible to the state superintendent of education, which indicates the department-wide scope of the research function. In a few instances the research officer reports to an assistant superintendent.

In twelve states funds for research are furnished by direct legislative appropriations, while in others the research budget is covered as a line item in the total appropriation for the department. Occasionally there are special legislative appropriations for specific projects or research programs, some of which are later incorporated into regular research appropriations.

A few state departments of education sponsor _educational research councils_, which are devoted to the stimulation, facilitation, coordination, or improvement of research. Members of these councils are drawn from universities, school systems, professional associations, and the state department itself, thereby affording liaison among institutions and agencies in the state concerned with research on education. The functions of these councils vary widely, but most commonly they secure financial support for research, serve as a clearinghouse for research activities, help the state departments to screen proposals, and advise the state department on research policy. In a few states the councils are sponsored by local professional associations with provision made for state officials on the executive boards.

Research Units in Local School Systems

A number of the larger school systems in the nation maintain research units, although once again the major portion of the work of these units is of a _service_ nature. Services such as testing, guidance, public information, planning, and data-processing are most commonly furnished. The heads of these units usually report directly to the superintendent of schools; and in some cases the director of the unit is actually an assistant or associate superintendent.

The number of personnel employed by these units varies with the size of the school district, of course. The largest city research organization is found in New York City (75 professional personnel and 80 other staff members). This largest unit in the nation, known as the Division of Research and Evaluation, is comprised of three research "bureaus": the Bureau of Educational Research, the Bureau of Educational Program Research and Statistics, and the Bureau of Curriculum Research. Among the major activities of these bureaus are the following: surveys and experimental studies for other departments in the system as well as for the unit's own purposes; a testing program; child accounting; curriculum planning and development; and collection of information and data from other school systems.

With respect to financial support, the annual per pupil cost for research varies extremely widely, from less than a dollar per pupil to more than $30 per pupil. The mean per pupil expenditure on research in 71 school districts surveyed in 1965 was $2.50. The average percent of the current operating budget that was devoted to support of these units was 0.56%.

Independent Research Organizations

A good deal of research is conducted by private agencies that are nominally independent of universities, and of local, state, and federal agencies; although all these institutions may participate in the work of these independently operated organizations. There are four main types of independent agencies that are engaged in research on education: testing organizations, professional associations, scholarship agencies, and research and development councils.

The better known testing organizations include Educational Testing Service, Psychological Corporation, and the American College Testing Program. (The American Institute for Research also does testing, but carries on a much broader program as well.) An outstanding example of research sponsored by a professional association is the Office of Research of the American Council on Education. Among the scholarship agencies, the National Merit Scholarship Corporation devotes most attention to research. Finally, councils represent particular school systems, state departments, and universities, while maintaining a certain degree of operating autonomy.

Space does not permit detailed treatment of all these types of independent agencies. Attention will be confined to illustrations of the two most common types: testing organizations and councils.

Although the Educational Testing Service (ETS) is primarily a service organization in the field of testing, there are two divisions that have a major research responsibility. These divisions contain about 25 professional members and 20 assistants. Not all of the projects carried out in these divisions are directly relevant to education, however. Studies of educational relevance include: college students' characteristics, career perception and college performance, problem-solving styles, individual differences in judgment and decision making, and personality organization and decision making. In contrast with schools of education, most of the professional staff received degrees in non-education fields; also, there is a stronger representation from psychology than one finds in the universities.

Councils are composed of local school superintendents, who support the disseminative and social bookkeeping activities of the council by annual subscription. These organizations may be statewide, regional, or even national in scope. Their chief purpose is usually to furnish school systems with comparative data regarding finances, composition of teaching staff, adoption of new practices, and so forth, and occasionally their objectives include more analytical types of research into educational problems. In most cases the administrative headquarters (executive secretary) is located in a school of education.

As an illustration, the Florida Educational Research and Development Council, Inc., represents 15 counties with a total pupil population exceeding half a million. The College of Education, University of Florida, donates half of the time of the executive secretary together with part of the secretarial services and some graduate assistant help. The member schools pay 5¢ per pupil annually. The State Department of Education and the Florida Educational Association are associated through the provision of consultants who meet with the council. The council has sought to identify a few major projects that might interest faculty members, who are then expected to apply for support from outside funds; research done by graduate students or by teachers is supported by the council. A Research Bulletin, published quarterly, reviews research on administration and instruction with the purpose of translating findings into school practices.

A rather unusual arrangement which resembles the regional school councils is the Learning Institute of North Carolina (LINC), a nonprofit private corporation that was started in 1964 by the presidents of two universities, the Superintendent of Public Instruction, the Chairman of the State School Board, the Executive Director of the State Board of Higher Education, the Governor, and a private foundation interested in community action programs. Flexibility of operations and objectives is one of the chief advantages of this arrangement. As a description of the Institute points out:

> Although it is supported by both public and private funds, it has a separate being as a nonprofit private corporation and is able, through this legal entity, to hold property, execute contracts, operate schools, conduct research, make grants, receive monies and do anything else which a private educational corporation can do . . . . Thus, it is extremely flexible; and in the first years of its existence, this flexibility will be enhanced by the fact that LINC has no precedents and no past history. (Howe, 1965)

Regarded as a center for educational innovation in the State of North Carolina, the Learning Institute is especially concerned with educational problems associated with poverty. It draws upon the research resources of the universities, enjoys access to the public schools of the state for research and development work, and operates its own "laboratory" school for eighth grade underachievers. The six agencies represented in the incorporation of the Institute provide funds, staff, and facilities.

Conclusion

A wide array of arrangements for educational research and development now characterize the American scene. It should be borne in mind that there is substantial variation within the major types delineated above. The organizational shape and program of each arrangement is affected by the quality and goals of the university in which arrangements of this type are located, by special local and state educational problems, by restrictions and emphases of particular funding agencies, and by the educational temperament of the nation in any given period. These variations render generalizations very difficult, even with respect to units within the major organizational types.

II. PROBLEMS ASSOCIATED WITH THE ORGANIZATION OF RESEARCH INSTITUTES[1]

Four general problems are commonly encountered that relate to the organization of research bureaus or institutes:

1. Problems relating to the extent to which research workers are free to initiate research rather than to conform to an organized program of research.

2. Problems relating to the balance between pure and applied research.

3. Problems arising from the relationship of research institutions to universities, teacher training establishments, etc.

4. Problems bearing upon the extent to which interdisciplinary research can be carried out.

In dealing with these four problems we have drawn heavily upon the volume, Organization for Research (Glaser, 1966), particularly upon the articles by Benjamin S. Bloom and Egon G. Guba. Bloom was particularly concerned with the need for more powerful conceptual models and theories that would unite each piece of research into a larger framework. Guba developed an analysis based upon the experience of the Bureau of Educational Research and Service at The Ohio State University and similar bureaus at other universities, relating especially to the following issues: crystallization of function (research *vs*. teaching or service), emphasis on field and applied activities, inability to mount a programmatic approach, lack of flexibility in responding to new approaches and requirements, cultural isolation in the university community, lack of adequate long-term funding, difficulty in mounting interdisciplinary efforts, the necessity for playing a leadership role in educational research for non-bureau staff members, and dilution of effort because of other university expectations. Their observations have been incorporated into the present discussion.

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[1] This section is contributed by N. L. Gage, Director of the Stanford Center for Research and Development in Teaching.

Individual vs. Programmatic Research

The first major problem to be considered is that of the extent to which research workers are free to initiate research rather than conform to an organized or programmatic approach to research.

Bloom points out that "while there is no lack of theory and model building in education, it is safe to say that very few models and theories have captured the attention of the field or that many individuals or teams of research workers are committed to a particular model or theory . . . . However, R & D centers should be expected to make some advances on the conceptual scheme as well as on the specific problems of research" (Glaser, 1966, p. 4). This is a clear call for a programmatic approach. But such an approach brings with it several problems.

First, there is the fact that an individual researcher requires the freedom to go where his thinking leads him, in order to be maximally productive. Autonomy is a very necessary ingredient. But how can the need for autonomy be reconciled with the need for making systematic inroads into a problem area? How can the researcher deploy his efforts in ways that are at once individually satisfying and institutionally productive? How can an organization's conceptual framework enlist the young research worker eager to make his own mark?

Second, the process of focussing inevitably leads to a certain loss of flexibility. Every institution feels the need to organize various subdivisions on some basis, and such organization necessarily includes certain activities and excludes others. The addition of programmatic elements simply increases that lack of flexibility even further. Once such subdivisions come to maturity, how can they be revised or even discontinued so as to make room for work on previously unforeseen educational and scientific problems? A simple answer, but one that is difficult to act upon, is that the divisional structure of research and development organizations should be periodically reviewed and revised. But vested interests often make such a rational procedure difficult to carry out.

Finally, the need for team approaches to educational research, in which varieties of specialized competence would be brought together, is clearly implied by the programmatic concept. But these team approaches would require changes in doctoral training programs in the universities in such ways that the traditional autonomy and independence of the doctoral student and his advisor will need to be subordinated, in ways still largely unknown, to the team approach. Such a radical revision of the well-established customs will prove to be difficult indeed.

Pure vs. Applied Research

In the United States, both the new research and development centers and the regional educational laboratories are mandated to bring about fruitful relationships between research, development, and dissemination processes. This mandate seems to call for a new kind of balance between what is often called, in other disciplines, pure and applied research, or between research and engineering functions.

In education this distinction has often been equated with the distinction between research and service, particularly in older bureaus which indeed often were called bureaus of research _and_ service. Such service has been rendered in response to specific requests from practitioners, usually in the form of consultation with university-based "experts" who specialized in that particular problem, such as curriculum surveys, plant studies, reorganization studies, and the like.

An equation of such traditional service with the emergent development concept in education could be disastrous indeed. This emergent concept is not concerned with assistance on specific local problems but with the generation of solutions to generalized educational problems. It is not concerned with expert judgment and advice but with scientific test and warrant. It is not concerned with endless, repetitious applications of the same solutions to the same problems but with an ever-widening circle of new and more sophisticated solutions.

Such an approach obviously brings with it many problems. Educators' stereotyped views of and toward service will have to be changed markedly to fit the new brand of applied research. Appropriate methods and techniques will have to be developed to carry out the new functions. New personnel will have to be trained with the requisite competencies and

and attitudes. Finally, educational leaders will have to be enlisted to administer the necessarily complex relationships and ensure the proper balance between pure and applied activity.

Relationships to Other Agencies

Thus far in the United States, research and development centers have been proposed on the initiative of various individuals, universities, and other organizations. Other approaches can be envisaged, however, whereby organizations would be developed according to levels of education, or fields of specialization in education, or regional or geographic problems, or national problems such as curriculum evaluation or cultural deprivation. These alternative approaches have already been attempted in various aspects of the programs of the R & D centers and educational laboratories in the United States, but not in any systematic fashion. The U. S. Office of Education, with its panels of consultants and advisors, is continuing its effort to improve the rationale of the present research and development organization, which may eventuate in greater realization of the advantages of these various approaches.

Meanwhile, most organized research institutes are located in universities. As a result of this location a number of problems arise which will undoubtedly be duplicated in new research units which are also university based.

First, there is often a crystallization of function which results in the division of professional educators into research workers and teachers, with the latter becoming increasingly divorced from the benefits and opportunities of the research assignment. Further, the emphasis on field service and similar applied activities has resulted in a draining off of resources into non-research activities and a kind of irreversible devotion to the solution of the practical problems arising in the operation of the school. Thus substantial segments of the university community feel a commitment to other, non-research functions which are seen as competitors for time and personnel. As a result "iron curtains" are drawn between the several camps making communication and cooperation virtually impossible.

Second, a kind of cultural isolation in the university community results from the concentration of research bureau personnel on non-teaching functions. Persons in a university who do not teach must invariably be seen as different, and therefore not quite accepted members. Further, this isolation affects the research training function of research institutes, and of course also their ability to attract first-class research workers who value highly the traditional role of the academician.

Third, the typical budgeting situation of the university renders impossible the kind of long-term funding for research that may typically be assumed for instruction. This lack creates a kind of instability nonconducive to the attraction and functioning of first-class research talent. In university bureaus, this condition arose from the increasing dependence of the bureau on income from its service function. In federally supported research organizations, in R & D centers and laboratories in the United States, this condition presently arises from the inability of the U. S. Office of Education to enter into firm contracts longer than one year in duration. (Indeed, in the early stages of the regional laboratory program, contracts were let, successively, for such periods as three months, six months, and nine months.) Whether it will be possible for research institutes, other than those supported by foundations, to gain the financial stability that has traditionally enhanced the teaching function, with its academic tenure, remains to be seen at this writing.

Fourth, problems also arise from the fact, as Guba notes, that "the conditions necessary for revolutionary change are difficult to arrange within existing university structures (Glaser, 1966, p. 14). These conditions--high risk-taking, sanctioned freedom to fail, and delayed gratification--are difficult to arrange because of the pressures on universities of increasing enrollments, facilities expansion, and competition for academic staff. Similarly, universities find it difficult to assimilate the new roles of developer, disseminator, field tester, and the like, which fall outside of the traditional roles of research and teaching. Attracting competent staff over the whole new range of disciplines necessary for broad attacks on educational problems also poses problems within traditional university staffing patterns. It is also hard to arrange the genuine collaborative arrangements with schools, that university research institutes must seek in order to make good on their commitment of development and dissemination, in view of the "traditional suspicion with which universities are regarded by public schools" (Glaser, 1966, p. 16). This suspicion arises, of course, from the fact that university research workers have typically approached schools only for their own research purposes rather than for the benefit of the school.

Last, research institutes have special problems in relating to their function of training research workers. Examples are: relating students to any ongoing program unless they are specifically employed by that program, giving students who are employed an educationally useful experience, making the student's experiences meaningful while they also contribute to the ongoing project work, and preventing the research institute's training functions from being regarded as a usurpation of other professors' proper functions. As Guba notes, ". . . project activities are tied too intimately to budgetary support to permit very many peripheral activities such as training" (Glaser, 1966, p. 18).

Interdisciplinary Research

The size and complexity of the major problems currently confronting education demands not only team approaches and programmatic effort but also the involvement of persons from a variety of disciplines. The insights which such an inter-disciplinary team can bring to bear vastly outstrip those which a group of educationists could muster utilizing only their own resources.

But mounting an inter-disciplinary effort is fraught with a variety of problems. The typical research institute does not have, on its own staff, persons with the requisite competencies; these must therefore be recruited from other university departments. However, such persons are usually interested in education only because the educational milieu provides a convenient "natural laboratory" within which to conduct experiments. The concern is thus not with education but with the particular theories and hypotheses to be tested. The research payoff, while possibly high for the discipline, is relatively low for education, particularly for the educational practitioner.

Persons from other disciplines who are attracted to work in education are usually regarded with slight contempt by their colleagues. Education is at best an applied science. It has certainly not been characterized by a high degree of rigor and respectability. The potential loss of status which might accompany acceptance of an invitation to work on educational problems is often enough to deter the scholar from a related discipline from becoming too involved.

Finally, non-educators are naturally not overly conversant with educational problems. A very special effort must be made to give them proper orientation and experience. It will be easy for them to underestimate the complexity of the educational enterprise and its problems.

Conclusion

It is of course possible to question the analogy between R & D centers, of the kind initiated in the United States in the years since 1964, and the traditional educational research bureaus in the universities. The problems that have arisen in the history of the educational research bureaus can be solved by keeping the organization flexible and innovative through periodic performance evaluation and planning and through re-arrangements of organizational structure. Perhaps the delegation of service activities and other recurring tasks to the regional laboratories and supplementary education centers will keep the R & D centers from foundering on these problems. Communication among various R & D centers, communication of R & D centers with the various academic professions, and the development of new organizational forms for providing researchers with incentives and opportunities--all of these may also help. Research and development in various kinds of human affairs is rapidly achieving the status of a profession in its own right. The necessary corps of research directors and senior staff who combine administrative ability with scientific standing will gradually emerge, as experience with the R & D centers accumulates. Similarly, the new professional role of developer and disseminator--the middlemen who interpret and implement research--will also become more mature.

III. RECRUITING AND TRAINING OF STAFF[1]

The function of training educational researchers in the United States is reserved almost exclusively to the major universities. There were 107 graduate schools of education (exclusive of technological schools) which awarded the doctorate in 1963-64. About 30% of these schools have not, in the past three years, produced any doctoral recipients in education who immediately entered positions where research was a primary responsibility (Sieber and Lazarsfeld, 1966, p. 337). Only 17 per cent of these institutions both emphasize research training and provide some form of program (most frequently the regular degree program) for students who want to make research a career (Sieber and Lazarsfeld, 1966, p. 257). The net addition to the body of active educational researchers currently approximates 150 qualified persons per year. Of this number about 60 per cent are graduates of eight state and two private universities[2] (Buswell, 1966, p. 37).

The information which follows describes the recruitment and training of educational researchers in the universities of the United States, rather than in private research institutions or some other setting.

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[1] This section was contributed by John E. Hopkins, Assistant Dean, School of Education, Indiana University.

[2] The state universities are: Minnesota, Illinois, Michigan, California (Berkeley), Texas, Wisconsin, Indiana, and Oregon. Columbia and New York are the private universities.

Recruitment

Few universities actively recruit doctoral students, but the five highest producers of doctorates in general have all reported extensive recruitment activities. Their most common recruitment practice is to encourage members of the faculty to stimulate their better master's degree students to continue their graduate studies. Although direct evidence is lacking of a relationship between this, or any other recruitment practice, and the production of researchers, obviously there can be greater selectivity where there are more applicants for entrance--and selectivity is definitely related to the production of researchers.

Six characteristic variables have been found to be related to later research productivity and may serve as foci for recruitment. These are (1) receipt of the doctorate by age 32, (2) an early decision to pursue graduate work, (3) less time devoted to teaching prior to the initiation of graduate studies, (4) undergraduate work taken in an institution which offered doctoral programs, (5) an undergraduate major in psychology, and (6) fewer than the average number of undergraduate courses in education. Ready availability of financial aids is also related to the recruitment of the more capable doctoral students. With the help of federal funds which are becoming available for training and support purposes, it is likely that more attention can, and will, be devoted to active recruitment in the future.

Training

For the sake of clarity the coursework, experience, and institutional components of training programs are presented separately in the sections which follow. However, it is the combination of these components which accounts for the production of active researchers. No single type of learning experience is adequate.

Coursework.[3] The courses taken by a doctoral student in educational research vary according to his desire (1) to create new methodology, (2) to teach methodology to others, or (3) to be competent to use the methodology. The core of course work common to all three pathways has been reported as including a single research methods course; two courses in statistics (factor and multi-variate analysis); experimental design; and three courses in educational and psychological measurement and scaling.

In addition to this core, courses in philosophy of science, research methods (e.g., questionnaire construction, sampling), basic mathematics (e.g., matrix algebra), and computer coding appear in a large number of programs. Most programs also require enough education courses for the student to be able to communicate with his non-research oriented professional colleagues.

The extent to which the three programs differ may be judged by the variation in the type and amount of statistics and experimental design in each. The program of those who wish to create new methodology is exemplified by advanced calculus, matrix theory, numerical analysis, finite differences and measurement theory, and frequently computer programing. The program of those who wish to teach methodology to others is exemplified by an approach based on probability, but without calculus. The users of research methodology take a program which begins with descriptive statistics and extends through analysis of variance.

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[3] Much of this section is based on the work of David R. Krathwohl, 1965.

An average of 9.5 courses in research are offered by the 107 universities in which the graduate schools of education offer a doctorate. However, these courses are scattered throughout several departments and are therefore specialized by field of concentration. An individual student is thereby restricted to taking fewer than this "average" number of courses (Sieber and Lazarsfeld, 1966, p. 293). Thus, it appears that the educational research trainee may have only a minimal opportunity to learn the tools of his trade through formal coursework.

Fortunately, however, the production of research workers does not depend solely on coursework. Indeed, Sieber and Lazarsfeld found the availability of research courses in schools of education to be unrelated to the production of researchers (Sieber and Lazarsfeld, 1966, p. 299).

Education doctoral students take a substantial number of courses outside the school of education. Fully half of the schools require their students to take courses in other departments. But no relationship has been shown either between the taking of non-education courses and research productivity or the proportion of faculty trained outside of education and the production of researchers.

Wherever they are located, the content of the courses appears to be quite similar if the use of standard texts is taken as a measure.

According to Krathwohl (1965, pp. 76) over half of the courses in educational research methods used as their basic text either Van Dalen (1962), Travers (1964), or Mouly (1963). The leading text in statistics was Garrett (1958), followed by Guilford (1956), Blommers and Lindquist (1960), and Ferguson (1959). Lindquist (1953) and Edwards (1960) were used almost equally and exclusively in courses in experimental design.

Experiences. The bulk of those who have written about research training indicate that the doing of research is probably the most important means of learning its methods and adopting proper attitudes. In practice, however, provision of research experiences other than the dissertation experience has been quite rare, even though a number of patterns of clinical experience are possible. Some of the patterns which Guba (1965, p. 287f.) has enumerated are:

1. The collaborator patterns in which students are attached to professors and collaborate with them on research problems.
2. The participant training pattern, in which students are attached to on-going projects where they participate to the extent of their abilities. The students may also be permitted to carve out an area of interest of their own.
3. The consortium pattern, in which consortiums of institutions each provide a graduate student of ability for staff service on a specific project. This pattern opens the possibility of exchange of students among institutions for special experiences.
4. The training team pattern, in which research trainees are brought together with a variety of experts and consultants to pool their knowledge for the solution of a problem.
5. The research institute pattern, in which students are associated with entire programs of research (as contrasted with a single research project) so that they can be rotated from one type of experience to another, as and when such seems necessary.

As many as one-half of the institutions which offer the doctorate in education require no research experience other than the dissertation; yet early immersion in active research projects is a characteristic of productive researchers. The practices most commonly followed in schools which do provide some research experience are the participant training and the research institute patterns. Both patterns have been shown to be associated with the production of researchers, although the participant training pattern is most effective in schools with a highly select student body where the trainees have a high degree of research participation. The research institute pattern is effective as long as the volume of student participation is sufficiently controlled to permit students to be rotated among projects according to their needs and abilities. Research institute experiences are enhanced further where they are integrated with training seminars which bring together students and project directors under the sponsorship of the institute.

Institutional and Program Factors. Several factors have been either negatively or positively related to the production of researchers. For example, a number of universities offer both the Doctor of Philosophy (Ph. D.) program, which is research-oriented, and the Doctor of Education (Ed. D.) program, which is practice-oriented. Where this is the case, both programs appear to suffer. The Ph. D. standards tend to become more similar to the Ed. D. standards. The Ed. D. candidates, on the other hand, appear to believe that their training in research is inferior to that of the Ph. D. candidates and they therefore tend to shy away from research involvement. However, the research training of the

Ph. D. candidates was found to be only slightly better than that of the Ed. D. candidates, so their feelings of inferiority were unwarranted (Sieber and Lazarsfeld, 1966, p. 287). The net result is very low production of active researchers.

The existence of an institutional climate which is favorable to research is a factor which is positively related to the production of researchers. The components of such a climate include (1) active faculty pursuit of research, (2) administrative arrangements for facilitating research activity, and (3) readily available advising and consultation services.

Where faculties are engaged in research, trainees not only benefit from having visible models of productivity, but they also enjoy a warmer reception for their research proclivities and greater opportunities to become involved in an actual research project.

Administrative arrangements for facilitating research might include a research bureau or institute wherein proper kinds of equipment are available, consultative assistance can be secured, and graduate assistants are obtainable. Similarly, a research administrator or coordinator may be named to facilitate administrative approvals, provide information on funding possibilities, and coordinate the overall activity of the school.

The opportunity to secure readily available advice on problems of research design is also a factor in the development of a favorable institutional climate as is the opportunity simply to talk with others about common research interests.

A program factor which is related to the production of research is the provision for full-time continuous study. Frequently interrupted, part-time and evening study (which is the way educationists generally get their degrees) is negatively related to research production. Further, the longer a person remains in the doctoral study program, the less involved he will likely become in research activities.

Financial Support Programs

Students decide which university to attend for three main reasons; its reputation, its location, and the financial support it can provide. So far as financial support is concerned, aid may be obtained in the form of National Defense Education Act fellowships, ESEA Title IV training grants, assistantships, honor programs, local scholarship funds, and in other forms. Among these, the major hope for the future appears to rest with the (Title IV) research training portion of the Elementary and Secondary Education Act of 1965. Included among the support features of that act are financial aid for undergraduate, pre-doctoral, and post-doctoral students.

Although a shortage of funds has now curtailed the undergraduate program, the simple fact of its existence continues to encourage the early recruitment of prospective researchers. An academic year allowance of $1,000 is provided to the university for each undergraduate student enrolled in an introductory research training program. During the summer, students are granted $75 per week with a similar amount going to the institution. No travel costs or dependency allowances are paid undergraduate students.

In the pre-doctoral (graduate) program, students are granted $2,400 the first year; $2,600 the second year; $2,800 the third year; and, where the program requires four years for completion, $3,000 in the fourth year. The institution is granted $2,500 per year per student to enable it to provide the necessary staff and program.

Dependency allowances of $600 per eligible dependent during the academic year, or $100 per dependent during the summer, are provided. The trainee is also reimbursed for his travel costs to the training institution.

Twenty post-doctoral grants are now issued on the basis of a nationwide competition. Persons holding a doctorate who have demonstrated an outstanding research interest and capability are eligible. Those selected are granted a 12 month stipend which is equivalent to the salary they would have received by continuing their regular employment. Their training may be pursued at any of the R and D centers or regional educational laboratories, or at any institution eligible to receive funds under the Title IV training program.

Conclusion

The recruitment and training of educational researchers in the United States is ripe for considerable change. Research data are becoming available to support or oppose features of training programs which have evolved through custom and intuition. Support funds will become available in sufficient amounts to warrant active recruitment from among the most capable graduate students. Program development and support funds will encourage experimentation in existing programs and the establishment of programs in institutions where none have existed heretofore.

In spite of these increases in the number of persons trained, preliminary figures from a manpower resource project now in progress at Indiana University (Clark and Hopkins, 1967) indicate that the gap between the number of available R and D positions and the number of trained R and D persons will number in the tens of thousands in the next five years. The pressures which will develop from this gap between demand and supply would probably be sufficient in themselves to create such training program changes as (1) a reduction in the length of the training program, (2) increased specialization among the roles toward which a given program is directed, and (3) increased emphasis on self-instruction and instruction-through-experience rather than student-faculty interaction. When these pressures are combined with the other forces for change cited above, there can be no doubt that considerable change in the size, organization, programs, and products of training programs can be expected in the next three to five years.

IV. DISSEMINATION OF RESEARCH RESULTS[1]

Introduction

Utilization of educational research results for improved practices in the United States is conditioned by the pluralistic nature of education in this country. Both traditionally and constitutionally education is a function of the several states rather than of the Federal Government. As a result, the degree to which research results are used to modify educational practice is largely a state or local decision, even though most research conducted in educational contexts and settings is supported at least in part by federal funds.

Federal support for educational research has been available for approximately a decade, with the current annual expenditure by the Office of Education for extramural research totaling approximately $100 million. Additional sums for educational research and research-related activities are available from such Federal agencies as the National Science Foundation, the Department of Labor, the National Institutes for Health, and the Office of Economic Opportunity.

During this same period, there has been a dramatic increase in Federal support for direct improvement of educational activities. During the fiscal year ending June 30, 1967, for example the Office of Education will provide more than $3 billion for educational activities. Much of this amount will permit educators to undertake types of innovations for which they can find little precedent in current practice. For this reason, educational research and its interpretation and diffusion have taken on new urgency. The educational researcher who was formerly the primary (and all too frequently the exclusive) audience for educational research information is now only one of a number of discrete audiences.

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[1] This section is contributed by Thomas D. Clemens, Assistant Director, Division of Research Training and Dissemination, U. S. Office of Education, Department of Health, Education and Welfare.

There are three distinct primary audiences for educational research dissemination programs. Each has different information needs and different competencies which result in different constraints upon the dissemination activities required to serve them.

The researcher is, of course, one of these audiences. Hopefully, dissemination efforts for the researcher will lead to more powerful educational theory; more socially relevant, methodologically sound, and less redundant study of educational phenomena; and wider recruitment of new investigators from education and cognate disciplines. The researcher may be expected to require full access to relevant technical literature, to data banks; and to reflective articles, research memoranda and experimental materials useful in carrying on both new and replicative studies.

A second, frequently neglected, audience is the educational decision-maker and practitioner, e.g., members of governing boards, educational administrators and supervisors, and teachers. A successful dissemination program for this audience may be expected to lead to educational programs which are based more squarely on scientific evidence, more rationally formulated, and more systematically implemented. However, this audience is not so thoroughly steeped in the language and methods of science as the 'hard-core' researcher and is less likely to be prepared to read and interpret technical reports. Further, this audience has limited time for reading and reflection upon large bodies of technical literature. Put simply, the characteristics and needs of this audience are those of the clinical rather than of the 'bench scientist'. These constraints dictate a dissemination program in which heavy emphasis is placed on interpretive and integrative reports of related studies, on case studies and other reports of practice viewed in the context of research findings, and on non-technical writing. Further, the characteristics of this audience dictate the presentation of research information in formats other than the classic scholarly report. Selected members of the practitioner audience certainly require access to individual technical reports, but such materials, essential though they may be, are insufficient to meet the total needs of this population.

A third primary audience is the general lay public, whose need is for information which will help them understand more fully the nature of current educational practices and needs, as well as the potential impact of new scientific findings upon future practice. Because the great bulk of this audience may be expected to have appreciably less information about the techniques and language of the scientist and the day-to-day practices of the educator than either of the other audiences, dissemination efforts for the layman require extensive translation of results into non-technical language, discussion of research trends as they relate to actual learning effects, and increased effort to relate research results to educational goals and problems.

Two smaller, but highly important audiences deserve special mention: the producer and distributor of educational materials and resources, and the legislator. Although smaller than the other three audiences, they are particularly important because of the vital role they play in the initiation and implementation of educational change. Their needs combine those of the practitioner and the lay audience, and hence require a fourth approach.

The remainder of this discussion will center around the resources and procedures for dissemination in a variety of institutional and organizational settings. It is suggested that these procedures be viewed in light of the foregoing comments on the structure of American education and the key targets of dissemination activities.

Professional Associations and Organizations

Historically, the primary network for dissemination of research information has been the professional association. Over 1,300 associations in the United States are concerned to a greater or lesser degree with the educational profession (USOE 1966). The great majority of these organizations are national or state professional associations, with some 200 being either professional fraternities and honor societies, religious education associations, or local associations.

In general, the clientele of the religious or state association is the educational practitioner. Dissemination services range from a periodic newsletter in the smaller organizations to one or more periodic journals. All provide inquiry-answering and referral services, and in a number of instances maintain a clearinghouse of institutional research information and other data or operating experience within a service region. Rarely do the publications of these organizations deal with technical reports of research, although there is a discernible trend toward publication of highly distilled interpretations of research information for the practitioner.

Some academic disciplines, for example psychology, have developed a number of regional professional associations which affiliate with a parent national organization. Most meetings of regional associations are devoted primarily to reading of technical papers. Since most of the associations are in the scientific disciplines rather than in education, reports most frequently deal with topics other than educational practice, although education as a research milieu is receiving increased attention.

There is increasing overlap in membership between educational associations and association in cognate fields, such as the American Psychological Association and the American Sociological Association. Journals of the cognate field include reports of research conducted in educational contexts. Both the APA and the ASA publish abstracts of research literature which are read not only by their own membership and educational researchers, but by educational practitioners as well. Of particular importance as linking mechanisms between the associations and the educational community are the Division of Educational Psychology of APA and the Division of Educational Sociology of ASA.

At the national level, a major dissemination network for educators is the National Education Association, which encompasses some 46 separate organizations and departments covering virtually every professional and technical field in education. An affiliate of NEA, the American Educational Research Association, is the primary organization for educational researchers. Among the key publications of this association are: the American Educational Research Journal, a refereed journal published quarterly; the Review of Educational Research, a "state of the art" publication each issue of which is devoted to a single topic, which appears five times annually; an annual directory; and a periodic newsletter. In addition, AERA has taken leadership in developing, for commercial publication, major compendia on educational research (Harris, 1960 and Gage, 1964).

Each of the other organizations which relate to NEA carry on similar dissemination activities in its own area of concern, including publication of some research reports. Although these other affiliates tend to place less emphasis on research than AERA, some, such as the Department of Audiovisual Instruction, publish their own research journals. In most cases, however, these associations give highest priority to a more comprehensive publication which includes among its contents articles which interpret research for the practitioner, or special research columns consisting of either abstracts or a referral service.

NEA itself publishes a series of short pamphlets entitled, What Research Says to the Teacher, each of which interprets the extant literature in a single topical area, such as reading. This series is developed through joint efforts of the publication staff of NEA, its Research Division, and AERA.

Other professional associations, fraternities, and honor societies engage in varying degrees in dissemination of research information to their clientele. Examples of such associations are the American Library Association, the American Personnel and Guidance Association, and the American Vocational Association.

A particularly interesting example of the efforts of an honorary fraternity is the program of Phi Delta Kappa. Its journal, the Phi Delta Kappan, devotes most of its space to articles on educational policy issues, trends, and developments, but also includes some interpretive research articles and referrals. The fraternity sponsors conferences and symposia on research and other professional concerns which are then published. Especially noteworthy is the School Research Information Service (SRIS). This recently-initiated service acquires, abstracts, indexes, and retrieves on request reports on innovative practices in the schools. The reports are available for purchase in microform and hard copy. SRIS, together with the Educational Research Information Center (ERIC) of the Office of Education (see below), provides educators with a means of access to research and research-related information to a degree hitherto unknown in educational research circles in the United States.

In short, professional associations and organizations disseminate research information: formally, through journals and other publications, through conventions and special symposia, through abstracting and dissemination services, and through organizational structures which facilitate linkages with other assocations and disciplines; and informally through referral services, ad hoc committees and task forces, and through spontaneous intercommunication among association members having related interests.

Universities

The university, like the professional association, is historically one of the major research dissemination channels in the United States. It is the most frequent recipient of grants and contracts for research in education, in addition to providing support for such research out of its own resources. It is the most substantial contributor to the corpus of research information. Indirectly, the very activity of universities as research producers makes them an effective instrument for research dissemination.

Because demonstrated productivity in scholarly study and publication is almost always one of the prime criteria for tenure and advancement among faculty members, there is strong positive sanction for the individual faculty member to conduct and report research. In most instances, publication in a refereed journal is more highly valued by the institution, thereby causing most research dissemination functions growing out of university activities to reach the scholarly community rather than the community of practitioners. Universities also frequently engage in dissemination of research by the preparation of overruns of final technical reports on sponsored projects. Such overruns are then distributed to interested persons.

Ancillary to these efforts, but highly noteworthy, is the increase of research on processes and strategies for dissemination and utilization of educational research results. At a few key institutions, including Teachers College Columbia University; Indiana University; the University of Kentucky; and the University of Michigan, this research emphasis enjoys institutional endorsement.

In its instructional function the university has traditionally served as a disseminator of educational research in graduate courses, particularly at the doctoral level. This is especially true in courses firmly rooted in the behavioral sciences, but it is also evident in courses relating to educational foundations and processes. There is some evidence of increased instruction in research techniques at the undergraduate level, based on such factors as the increasing corpus of educational research and the concomitant inclusion of findings in education texts; increasing availability of funds for extramural research; increasing levels of research competence among faculty members; and availability of federal funds for research training in education.

Another instructional development which promises to foster improved interpretation and dissemination of research for the educational practitioner.is the continuing extension and in-service training programs carried on by teacher education institutions. The increasing demands for research information by practitioners is causing such extension courses to take on a greater research orientation.

Certain community service functions of universities also contribute to dissemination. In addition to special instructional programs conducted in extension or through correspondence study, the university also encourages its faculty members to serve as speakers and consultants to community groups. Here, however, the degree to which research information is interpreted and diffused is more influenced by the predispositions of the speaker than by institutional policy. In their consultative role, however, university personnel frequently draw heavily on the research literature, since most requests for consultation have specific task orientations to which research interpretation is appropriate.

A final major influence which institutions of higher education have in research interpretation is through their publication programs, particularly as manifested in university presses. The output of many university presses, particularly in their so-called "monograph series," may be limited to doctoral dissertations or technical reports on university sponsored research conducted by the faculty. In other cases, however, significant compendia and research interpretations are published. To date, the output of research publications in fields other than education has been greater than that in education.

Government Agencies

The introductory portion of this paper referred to the pluralistic nature of American education. Without attempting to deal with the variations in practices in all 50 states, this section will discuss briefly some dissemination activities at three separate levels: local school districts, state education agencies, and the federal government. A fourth jurisdictional level, of varying importance in different states, is an intermediate unit which most frequently coincides with the county government. At its lowest level of operation, the intermediate unit serves as a record-keeper for local districts; in other cases it is either a surrogate for the local district or has special administrative responsibilities delegated by the state education agency or established by statute. In most cases, variations in practice in intermediate units range between those described below for state and local agencies.

The primary if not exclusive role of the local school district in research dissemination is to serve as a recipient of research information from other agencies and to transmit such information to teachers or principals. The most common entry point for research information is the school district office, e.g., the superintendent of schools or his staff. It is not uncommon, however, to see an individual supervisor, or building principal, or teacher as entry point. In general, more impact on practice is likely to occur if the information enters at a higher level in the district.

The school district, particularly in large urban or well-to-do suburban districts, is also the locus for the use of research findings in assessing the need for and feasibility of educational innovation. Under the most favorable circumstances, research information may provide guidelines for accommodating an innovation to local constraints and for the installation of the innovation. Most frequently, however, innovative practices are initiated without reference to extant research information.

As the tax base, the population of the community, and the school enrollment increases, one is more likely to find local school districts engaging in direct efforts to interpret and disseminate research information. Again, urban or well-to-do suburban districts are much more likely to engage in such activities than are rural or economically underprivileged districts. It follows, then, that the role of the state and federal agencies take on increasing importance as the size and wealth of school districts decrease.

As the major administrative arm of the state in educational matters, the state education agency can be a key switching point in the educational research diffusion process. In a state agency such as that of New York, an organizational unit with substantial staff and budget may be established for diffusion of educational innovation. In other states, diffusion efforts are limited to individual intercessions of subject matter supervisors. As one might expect, more research based diffusion is discernible in the former case than in the latter. An intermediate position between these two is that of state agencies which allocate a portion of their publication budget to interpretation of research information appropriate for use in local school districts. Through funds made available by relatively recent federal legislation, state agencies now have an opportunity to expand and improve many of their services. Among the uses which can be made of such federal monies is the recruitment of new staff in research dissemination roles.

The federal government provides a variety of information services for behavioral and technical audiences, some of which may be of benefit to educators. One of these is the National Referral Center for Science and Technology (Library of Congress). Established in 1962, this center does not answer technical questions directly, but refers inquirers to organizations, individuals, and institutions capable of furnishing information.

A second such service is the Clearinghouse for Federal Scientific and Technical Information (National Bureau of Standards, U. S. Department of Commerce). This clearinghouse has a bank of 500,000 research documents and provides among its services bibliographic searches on a reimbursible basis, referral services for documents not in its collection, and microform or hard copy of documents for a fee.

The National Library of Medicine (U. S. Department of Health, Education and Welfare) also provides information services having relevance to education. It catalogs, indexes, abstracts, translates, and publishes literature in the medical and biological sciences and provides referral services and copies of documents through photoduplication and interlibrary loan arrangements. Similar services are also provided by the National Institute of Mental Health and the National Institute of Child Health and Human Development.

The primary federal agency concerned with education is the Office of Education, U. S. Department of Health, Education, and Welfare. A primary purpose of the Office upon its establishment a century ago was diffusion of information. With the passage of legislation for support of educational research, this mandate has begun to relate more and more to educational research dissemination functions. Every grant or contract awarded for research has as a condition the submission of a final technical report which is made available to interested readers. A variety of research and development authorizations also permit awards for such dissemination activities as production of state-of-the-art papers for researchers, interpretive synthesis for practitioners, development of audiovisual reports on research, and support for demonstrations, conferences, and site visits for research dissemination.

In addition to these types of projects, two programmatic activities supported by the Office have dissemination functions. University based educational research and development centers carry on programs of research, development, and dissemination in clearly defined areas such as higher education, or teacher education. These centers devote most of their efforts to basic and contextual research and dissemination of their results, either as technical reports or interpretive publications. It is believed that this type of program reduces the time lag between production of research findings and their availability to the field.

The second programmatic effort is carried out by a national system of 20 regional educational laboratories, supported under the provisions of Title IV of the Elementary and Secondary Education Act of 1965. Although the mandate of the laboratories is similar to that of the research and development centers, they place more emphasis on application, development, and installation of innovation in educational institutions.

The Office of Education also operates the Educational Research Information Center (ERIC), which consists of a network of decentralized clearinghouses, currently 13 in number, each of which acquires, screens, indexes, and abstracts research reports in a single topical area. The 13 areas, with clearinghouses operated by institutions of higher education or professional associations include: counseling and guidance, education of the disadvantaged, educational administration, exceptional children, junior colleges, linguistics and uncommonly taught languages, reading, rural education and small schools, school personnel, science education, teaching of foreign languages, vocational education, and adult and continuing education. As they mature, clearinghouses are expected to devote greater amounts of time to such dissemination functions as the development of selective bibliographies and the preparation of interpretive reports.

The clearinghouses are coordinated by Central ERIC, a staff operation within the Office of Education, which also monitors service contracts for computer and reproduction services. Central ERIC has developed and continually revises a special thesaurus of educational descriptors which provides intellectual access to materials stored in the system. It has activated Research in Education, a monthly abstract and index publication which currently includes information about research projects, completed and in progress, supported by the Office of Education. By July of 1967, the total corpus included in issues of Research in Education should approximate 1,800 final reports and 1,000 to 1,300 reports of research in progress. Thereafter the annual increment to the bank will be approximately 1,000 to 1,500 final reports, a like number of reports of research in progress, and 4,000 to 5,000 research reports from other sources which have been acquired and abstracted by the clearinghouse. Individuals interested in receiving the full text of research reports included in ERIC may purchase them on microfiche at 9¢ per fiche or in hard copy at 4¢ per page.

Private Publishers, Foundations, and Mass Media

It has already been indicated that textbooks in education tend to include more research-based information than in previous years. It might be added that such textbooks not only refer to educational research, but have increasing discussion of research from the cognate disciplines, including experimental and social psychology, cultural anthropology, and the behavioral sciences in general. Also mentioned has been the cooperation between publishers and professional associations. One other noteworthy trend deserves to be mentioned: the tendency of publishers to devote more of their resources to interpretive summaries of educational research. One publisher has issued a library of 100 interpretive volumes, organized around six topics - curriculum and teaching; administration, organization and finance; psychology; history, philosophy, and social foundations of education; professional skills; and educational institutions. Each volume is written by established scholars and reviewed by a panel of prestigious educational researchers and practitioners.

Foundations, with a long history of providing support for educational research and demonstration activities are continuing their efforts despite the marked upsurge of federal funds for educational research.

Their dissemination efforts include direct publication of reports, intercession with private commercial publishers, and support of research-based demonstration projects.

Until recent years, mass media coverage of educational activities was largely limited to local coverage of isolated stories, to education departments and columns in news magazines, and public service broadcasts on radio and television. Some of the larger newspapers had education editors, but most coverage was devoted to policy issues and news reports. The only information resembling research interpretation for the layman were occasional programs on educational radio and television stations and syndicated newspaper columns giving advice on child-rearing and educational problems. Increasingly, however, there is a tendency for the mass media to make presentations on new educational developments based on research, and even, on occasion, to cite research results as substantiation for the viewpoint of the presentation. One or two instances could even be cited in which a major article in a national magazine was devoted to a discussion of research dealing with educational matters. It must be admitted, however, that these trends appear to reflect changes in reader interest to a large degree, rather than any substantial policy change on the part of the media.

Conclusion

It has been only in recent years that educational research results were sought out by anyone but educational researchers and a small number of educational administrators, teacher educators, and teaching and supervisory personnel. Recent increases in funds for educational research and innovation, particularly from the federal government, have led to increasing demand for research information by larger and different audiences.

In response to these demands, the professional associations, the universities, and the private foundations continue to play major roles as research communicators and interpreters. Increasingly, teacher education is making use of research information, and the mass media are entering the field as interpreters of research for the lay public. Federal agencies serve both as sources of funds for dissemination purposes and as operators of diffusion programs. Significant recent developments have included development of information systems based on library and information science research, and pointed toward intercommunication systems using current and emerging tele-communication technology; and an increasing concern for differentiated research information services for a variety of different audiences. Of particular importance is the interest in interpretation of research results for the educational decision-maker and practitioner. Both governmental and professional organizations are undertaking such interpretation activities with the goal of encouraging application of research results in educational practice.

Because of the pluralistic nature of education in the United States, a single, monolithic educational research information system has not developed, nor is it likely to develop. There is evolving, however, a group of mutually supporting research information systems growing out of existing resources and supplemented by new resources, private and public, local, regional, state, and national.

V. ROLE OF RESEARCH IN THE INNOVATION PROCESS[1]

Education in the United States involves two million teachers, 25,000 local school systems governed by laymen and influenced by parents, thousands of parochial and private schools, 2,000 colleges and universities governed jointly by their faculties and their 2,000 boards of trustees, hundreds of commercially-operated schools, 50 states which create or authorize and ultimately control most of those schools, and a federal government which supplies 10 per cent of the total expenditure on education and which exerts considerable influence on the direction of educational programs. The United States is a nation where teachers may be trained almost everywhere and taught almost anything; where curricula may be designed anywhere and books written by anyone; and where school materials are published commercially, advertised competitively, and sold at a profit. It is, finally, a nation where research pertinent to education is supported largely by the federal government and conducted largely by individual university professors working on limited projects under federal contract.

Clearly, the conversion of educational research into practice in the United States is anything but straightforward.

The Research Base for Current Practice

The extent to which practice based on research has diffused into public elementary and secondary schools in the United States can perhaps be best judged by examining the origins of those practices which are predominant today. How many owe their beginnings, or their character, or their ubiquity to research findings?

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[1] This section is contributed by Henry M. Brickell, Associate Dean for Research and Development, Indiana University.

The following are illustrative of prevailing practices:

> Each of the states designates education as a state responsibility and retains ultimate authority over it. Although the states exert close control over a few aspects of school operation, each (except Hawaii) has created local school districts to whom most authority is delegated. Each state then supplies part of the funds (40 per cent on the average; 5 per cent in Nebraska; 80 per cent in Delaware) needed to operate the schools. The national government supplies 10 per cent of the funds, chiefly for specific programs thought to be in the national interest, and closely regulates the way the funds are used.
>
> All states[2] compel attendance of both boys and girls, usually from ages six through 16. Schools are usually operated from Monday through Friday, early September to mid-June, 180 days each year, from the hours of 8:30 a.m. until 3:00 p.m. Supplementary instruction is frequently scheduled after 3:00 p.m. and during July and August. Instruction is divided into twelve annual blocks called grades and pupils are promoted to the next grade at the end of each calendar year except in cases of extremely low achievement.
>
> Teachers are licensed by the state after four or five years of college or university training in an approved set of courses in substantive fields and in pedagogy.
>
> Elementary school children are given compulsory instruction in the English language, history and other social sciences, mathematics, science, art, and music. High school students are instructed in the same subjects, with only English and social sciences being compulsory after grade 8, and with foreign language, industrial and commercial subjects, physical education, and driver education being offered as options beginning in grade 9. Most elementary school teachers teach all subjects while most high school teachers teach only a single subject.
>
> The typical class consists of about 30 pupils taught by one teacher. Content to be learned by students is contained in one or more basic textbooks and practice books, supplemented by other printed and audio-visual materials.

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[2] A few states have recently repealed their compulsory attendance laws in a move to prevent racially integrated schools.

The quality of each student's work in school is reported to his parents in letter (A, B, C, D, E) or number (100%, 90%, 80%, 70%, 60%) form every 6 or 8 weeks and summarized at mid-year and at the end of the year.

This list could be lengthened by other practices which, like these, have achieved almost universal diffusion--and, remarkably enough, without benefit of a centrally controlled system of schools.

Each of these practices was at one time a unique, original, fresh solution to some school problem. Each began in one location, then spread until it became commonplace. Yet not one can lay claim to a substantial research underpinning. In most cases the invention neither originated in basic research studies nor was the subject of research during its creation. In no case could appreciable research evidence about its effectiveness be offered by those recommending its adoption.

Some of these practices have been the subject of empirical study, after the fact, with a great many of the findings being inconclusive or conflicting. Such findings have had no appreciable effect on public or professional allegiance to the practice. At the same time, however, other influences have had an effect.

Class size, for instance, was the subject of repeated and largely unilluminating studies for some three decades. Practice changed hardly at all as a result. Research interest in class size lapsed after the 1940's. During these several decades, however, the National Education Association often reaffirmed its allegiance to an ideal class size of 25 pupils. Under this pressure, class sizes dropped slowly without ever reaching the ideal figure.

Then suddenly, in the late 1950's, old assumptions began to be sharply challenged and practice began to change. The chief apparent force behind the move was the admixture of funds from the philanthropic Ford Foundation and the interests of a few leaders in the National Association of Secondary School Principals. Within a few years the Association's Commission on Staff Utilization had secondary school principals talking of classes ranging in size from one pupil to several hundred, depending on the nature of instruction to be given. Many schools began to experiment by scheduling classes both larger and smaller than the traditional 25-35 pupils.

The relative weakness of research in contrast to other forms of endeavor in changing educational practice was revealed once again. This is not to say that research has no influence on school practice in the United States. It is clear, however, that as of the year 1967, school practice in this nation cannot be understood as being based primarily on research.

Research at Several Stages of the Innovative Process

The term innovation is used here to encompass the entire process of generating a new form of educational practice (along with the concepts underlying it and the materials needed to execute it), trying it in small-scale laboratory settings to get information for the purpose of redesigning it, testing it in a variety of field locations (to discover what it will do under normal conditions) and disseminating it to prospective adopters (to inform and aid them in adopting it). Adoption, which must accompany dissemination (dissemination is sending; adoption is receiving), is also included in the definition.

Research can be useful at every stage of this process:

1. Generating a new form of educational practice. Obviously research can provide the basis for a new practice. Concepts, principles, and theory derived from research can be utilized to create new solutions to particular problems of interest.

2. Trial in small-scale settings. Once a solution has been created, perhaps by reasoning from a knowledge of the basic workings of the phenomena to be regulated, there is a great value in testing its effect before it is combined with other processes into a comprehensive, interlocking set in which its peculiar contribution (or failure to contribute) might be difficult to detect. Small-scale tests of pedagogical inventions should be governed by research methods. The results should then be used to guide necessary redesign.

3. Testing in Field Locations. When a new form of practice has been assembled from tested components, it should be tested as a whole in the entire range of settings for which it was designed. Inasmuch as the new practice will probably be placed into competition with current or alternative practices, and inasmuch as the outcomes of the test are likely to be mixed, careful research is necessary to maintain intellectual control over the data resulting from the test.

4. Informing and Teaching Prospective Adopters. Those responsible for disseminating a practice into appropriate locations (as revealed by field tests) may compare the results they achieve through informing prospective adopters about the innovation through one method, such as printed

bulletins, versus the cost and effect of informing them about the practice through other methods, such as personal interviews. They may study the rate of diffusion of a practice so as to decide when to terminate their efforts. For any such purpose, research techniques are appropriate.

5. Adopting the New Practice. The person or the administrative unit adopting a new practice can of course conduct research on the effects of the change. Indeed this obligation is quite clear since the adopting units in all likelihood did not take part in the field tests and in all probability do not match perfectly any of the schools which did.

Research as a Limited Source of Information

The fact that research is a valuable tool at every point in the innovative process does not mean that it is a sufficient tool.

For example, while research defined as empirical inquiry is an extremely useful tool for investigating the phenomena which schooling would regulate, so also is historical research, reasoning by analogy, thoughtful application of principles derived from other fields, raising of value questions and a resolution of value issues, philosophic speculation, synthesis of principles into theoretical formulations, and other forms of mental endeavor.

In the same fashion, a person choosing curriculum content to be transmitted by a new form of educational practice will certainly depend upon the advice of scholars rather than simply upon any empirical research he might conduct.

Similarly, the person or the staff responsible for evaluation during a field test is likely to supplement empirical research by impressions gained while observing the innovation, the testimony of users, the feasibility of the plan as shown by initial difficulties in getting it installed, unanticipated side effects, the availability of alternatives which might accomplish the same objective at lower cost, public reaction to it, etc.

While those responsible for dissemination may conduct empirical studies on the consequences of their own activities, they too will gather information through observing the degree of enthusiasm prospective adopters express when they see the practice demonstrated, the rate of sale of program materials, the persistence of trainees in any training program, the frequency with which the practice is described from professional platforms and in professional journals, the testimony of distinguished educators about its value, the testimony of users about help received from the disseminators, the number of requests for assistance coming into the office, the degree of satisfaction expressed by the staff with its own work, and so on.

In addition to any research conducted in the administrative unit adopting a new practice, teachers will be asked their opinions about the values of the changeover, students will be questioned about their reactions, parent opinion will be judged by the number of complaints and the expressions of support received, visitors will be counted, etc.

In short, the amount and variety of information needed during the process of innovation is so great that not all of it can come from research. Some of it must come from precedent, the judgement of experts, the experience of the resident staff, practice in similar settings, practice in other types of settings, values which infuse the society, and other sources. Thus research findings may be thought of as only one among many kinds of useful information.

Research as a Competing Source of Information

When research-based information does exist, it must take its place beside all the other information available. The research finding may coincide with and confirm the other information. In such a case, the chances of its being used are good. Or it may be the only source of information on a specific topic, in which case its chances of use are probably only fair because it is not substantiated by experience. Or it may conflict with other information, in which case the situation is one of competition.

In the United States even today, research findings do not compete well against such established, persuasive information sources as one's personal experience or knowledge of what other schools are doing. For example, when a local school asks, "What might we adopt to solve our particular problem?" a very limited number of solutions (at best) generated through a research and development process compete for its approval with a larger number of solutions which have been generated without benefit of research. The prospective adopter is not likely to select the research-based solution solely because it stands on a base of scientific knowledge, especially if something else is less expensive, easier to install, preferred by the faculty, or otherwise attractive.

Some Examples of Research Influence

By selecting highly visible innovations which have diffused into the schools and searching for their research underpinnings, we can find some examples of research which shaped--or at least accompanied--significant changes in practice. The cases selected illustrate different modes and degrees of influence.

Psychology--a case of envelopment. Psychology is the one branch of science which has given long and serious attention to education. The consequence for education has included a jargon derived from psychology, a predilection among educators for psychological interpretations of school phenomena, the use of research designs and statistical methods copied almost entirely from psychology, the employment of school psychologists at salary premiums, and an overdependence on test results for making decisions about pupils.

Psychometric research provided the base for the great testing movement which surged through United States schools in the 1920's and led to a set of ability and achievement tests which are unquestionably the best-researched tools in the teacher's kit. The development of reliable tests of mental ability made possible the positive identification of mentally retarded and intellectually gifted children and set the stage for their separation and differential treatment. In fact, the practice of grouping all children by ability became possible with psychometric research and the easy-to-use instruments it generated.

Thus we have a case where practice has been surrounded and suffused by a single social science--its concepts, its views, its research techniques, and its research-based knowledge.

Eye camera studies--a technological breakthrough. Gestalt psychology and the invention of a camera to photograph eye movements of readers led to the discovery in the 1930's that readers perceive whole words or phrases rather than isolated letters. This finding furnished a basis for postponing the teaching of the alphabet and eschewing phonics in favor of the whole-word method of teaching reading. Variations of the method were worked out by professors of education, who taught them to teachers and wrote the books that would be used with children. Research on children's vocabularies during the same years led to the careful selection of words and the use of a graduated series of books for beginning readers. The controlled-vocabulary basal reading series employing the whole-word method has dominated the teaching of reading ever since. In this instance a technological breakthrough made possible the research findings that had a profound influence on practice.

The Eight-Year Study--Capstone to a Movement. At the pinnacle of the progressive education movement in the early 1930's, a plan was laid for research to strike a mighty blow at college control of high school curricula. A number of colleges were persuaded to accept without question the recommended graduates of thirty progressive high schools which had modified their traditional college-preparatory curricula. The study followed students through four years of high school and four years of college, and found that the thirty experimental programs were generally as good as traditional programs in producing academic achievement and also tended to produce students with better social skills. The results of this massive, well-designed study had been awaited with great professional interest, but by the time they were announced progressive education had fallen from whatever public favor it enjoyed and World War II was beginning.

It is difficult to assess the effect of the Eight-Year Study on high school curricula. Probably its chief contribution was to give a research-based justification for what was already happening for other reasons. The influx of non-college-bound students into the high schools in the depression years of the 1930's had drastically reshaped high school curricula. The war added such new courses as pre-flight training and made vocational courses such as welding seem to be in the national interest. At the very same time the colleges themselves were breaking their own traditions in emergency training programs for thousands of military personnel stationed on campus. Colleges did not begin to regain control over high schools until the late 1950's, and with a weakened grip even then.

Social science on segregation--a research underpinning for justice. In 1954, the Supreme Court demolished the fifty-year-old legal basis for racially segregated schools, citing in its opinion seven sociological studies, two of which were perhaps most influential; Gunnar Myrdal's *An American Dilemma*, (1944), and an opinion poll of social scientists showing that some 90% felt that school segregation by race, religion, or ethnic background was damaging to the segregated group.

The court decision had immediate impact in "border" states separating the South from the North and triggered a long string of lower court decisions which are very gradually reshaping the racial composition of schools even in the deep South. One may seriously suggest that the time had come for this historic social change and that the research was cited to make scientific that which was already sufficiently political. Myrdal, after all, had published his great work ten years before. Moreover, the social scientists' opinion poll was taken after the decisive cases were already working their way through the courts.

PSSC and other course content improvement ventures--a route to significance for research. Beginning in 1956 with the development of the landmark PSSC physics course, the National Science Foundation paid scores of leading scholars to write totally new textbooks and design fresh materials for teaching mathematics and science. The modernized, content-rich, high-quality books they wrote set a whole new standard for education materials, so sharply did they break with the pallid predecessors produced by earlier writers who were far from the frontiers of scholarship. By 1956, less than a decade after their appearance, the science courses had been adopted by half the high schools, achieving one of the most remarkable successes ever enjoyed by an educational innovation in the United States.

But where was research in all this success? The new courses were tested in segments as they were being developed and were subjected to occasional research afterward. Typical finding: PSSC students scored as high as other physics students on national examinations. This kind of sure-fire finding, squarely in the long tradition of "no significant difference regardless of the treatment," wedged a research footing under a structure already erected on other grounds.

The Conant high school report--a voice behind the findings. In 1959, James B. Conant, former president of Harvard University and an enormously respected figure in academic and public life, wrote The American High School Today. In the book he reported his study of a sample of comprehensive high schools and published the profile scores of twenty-two schools (about a third of his sample) on a set of quality indicators he had selected. Typical item: Percent of high-ability students completing four years of mathematics during high school. Conant's study received nationwide publicity and was discussed everywhere. Many schools rated themselves on his criteria.

A follow-up questionnaire to 2,000 high schools eight years later showed that practice had indeed moved in the direction Conant recommended. One can only speculate, but it would seem that Mr. Conant's towering reputation combined with the timing of the study (when the nation was still in shock over the launching of Russia's Sputnik I and emergency moves of every sort were being made to upgrade math and science programs and to stiffen work for the gifted) had more to do with the change than his simple survey of practice in half a hundred high schools.

Head Start--research overrun by events. In the aftermath of the push for Negro civil rights early in the 1960's, a large family of social action programs was created by the federal government to help close the mammoth socio-economic gap separating Negroes from whites. In that family of programs, one member excited public and professional imagination as few educational programs have ever done. That program was Project Head Start--pre-school training for four or five year olds from culturally disadvantaged homes. Its intent was to compensate for inadequate early childhood experiences by giving deprived children an early beginning in school. Originally announced as a $15 million undertaking, the Head Start program was so inundated by applications from eager schools that the bill, still in Congress and not yet passed, was amended to $50 million, then to $85 million, before Congress could put it to a vote. It passed. The next year the bill went in at $150 million and passed readily. Proposals for the third year would double that amount. Meantime, other federal funds received by local schools for disadvantaged children were frequently being used for pre-school classes.

The promoters of Head Start cited educational research findings as justification for early schooling. Among the most-mentioned works were Intelligence and Experience by J. McVicker Hunt (1961), Stability and Change in Human Characteristics by Benjamin Bloom (1965), summarizing some 1,000 studies, and the writings and experimental classes of Martin Deutsch. Their work, and that of countless other researchers, pointed to the over-riding importance of the early years in the lives of children, even in establishing their intelligence.

The very fact that such findings were not new but had been well known for many years suggests that events had pushed them into significance rather than the reverse. Although research was silent as to whether a few weeks or even a year of pre-school of an undefined character could raise a deprived child above his upbringing, the nation in its urgency would not be denied Head Start and its promise.

Subsequent research indicated that Head Start gains, and there were some for the children enrolled, had evaporated by the end of the first year of school. This need not have been surprising in light of earlier research indicating that children who had been in kindergarten as five year olds could not be distinguished from other children by the end of elementary school. However, the current national conclusion from the Head Start findings is that something is wrong with first grade. A bill now before Congress would appropriate funds to correct that in Project Follow-Through.

Conclusion

It may be that the new arrangements which have been made in the United States to transmit research findings into useful forms of practice will give educational research new power.

Meanwhile, powerful research can be recognized by the company it keeps. Indeed, the company may be what makes it powerful. Thus for the time being one could wish nothing better for good research in the United States than that it occur on the occasion, and point in the direction, of an idea whose time has come.

VI. CONCLUDING NOTE[1]

The five preceding sections of this report have described the status of educational research in the United States, and its relationship to practice. Generally speaking the major characteristics of American educational research may be summarized as follows:

1. It is loosely organized. A wide variety of agencies and individuals conduct educational research. There is no central organization nor central coordination of research efforts.

2. It is university-based. Most educational research is conducted by university personnel, rather than by persons employed by other educational units such as local school systems.

3. It is individually directed. Topics for research are chosen very predominantly on the basis of the interests of individual researchers.

4. It is theory oriented. Much educational research is conducted by persons from related social and behavioral disciplines such as psychology and sociology. The research thus tends to relate to the theories of those disciplines (for the testing of which the schools serve as an ideal "natural laboratory") rather than to the solutions of practical educational problems.

5. It is committed to experimentalism. The experiment is viewed almost universally as the proper format for scientific inquiry. Non-experimental approaches are viewed as inferior or misleading.

6. It is conducted primarily by persons trained in a psycho-statistical tradition. The training of many practicing researchers is heavily based in educational psychology, statistics, and measurement theory. Most current training programs continue to emphasize this same tradition.

7. It is part-time pursuit. Most educational research is conducted by persons who have other demanding duties, primarily teaching. Very few researchers are able to devote as much as one-third of their time to research.

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[1] This section is contributed by Egon G. Guba and John J. Horvat, Director and Executive Officer, respectively, of the National Institute for the Study of Educational Change, Bloomington, Indiana.

8. It is federally funded. Most educational research is funded by the federal government. Expenditures by foundations, by other levels of government, or by local school systems, while substantial, are small by comparison.

9. It is understaffed. Only a small number of persons are engaged in educational research for any substantial portion of their time. The number of replacements and additions currently being trained is very small in comparison to the demand.

10. It is underfunded. The total national investment in educational research from all sources is less than one per cent of the total national expenditure for education.

The last two of the above mentioned characteristics would probably be universally described as unfortunate. No serious student of the research scene would argue that low levels of staffing or of support are desirable. The first eight characteristics are subject to wide interpretation in terms of desirability, however, depending upon the values of the interpreter. Each of these characteristics lends both strengths and weaknesses to the system. If it were proposed that a new research structure be developed, the developer would be faced with a series of judgments relating to these eight characteristics. In each case he would need to decide whether, in his situation, the virtues connected with the characteristic are sufficiently important to over-ride the concomitant defects which will inevitably accrue. These eight characteristics will be considered in some detail so that the virtues and defects of each are made apparent.

A Comparison of the Virtues and Defects of Each Major Characteristic of American Educational Research

1. Loose organization. The most obvious advantages of loose organization are flexibility and simplicity. The research community is

able to make a quick and effective response to research needs as these become apparent. There is no bureaucracy to dictate the "right" or "wrong" directions for research to take. There are no long and involved channels through which approvals must be sought. There is no cumbersome administrative structure which must continually intervene to justify its existence.

But there are also disadvantages inherent in this loose organization. The most obvious is the lack of overall coordination. It is difficult to enlist and combine the efforts of a number of persons or agencies in the pursuit of a common research objective. Resources cannot be allocated in the most efficient manner. Communication is difficult to maintain. There are likely to be overlaps in the programs of competing agencies that cannot be justified as scientifically warrantable replications. Similarly, many important gaps may develop to which no one attends.

In making a decision in relation to research organization, then, the choice must be made between flexibility and simplicity, on the one hand, versus poor communication, possibly inefficient resource allocation, and lack of programmatic thrust, on the other.

2. University base. The university is the traditional seat of research, and for good reason. It has available a pool of talented manpower resources that would be difficult to duplicate in any other setting. The university-based educational researcher can easily communicate with a variety of experts in other disciplines who can bring their special insights to bear on his problem. The university's posture

of detachment makes possible the high risk taking and sanctioned freedom to fail that are so necessary for the psychological support of the researcher. The reward system is geared to the advantage of the productive researcher who thus finds a "natural home" in the university. Finally, the university has available a plentiful supply of inexpensive and committed labor in the form of graduate assistants, and usually has excellent facilities, such as the computer center, which ease the operational burdens of conducting research.

On the other hand, the interest in the production of new knowledge which characterizes the university research setting militates against the more "practical" research required by the practitioner. In the United States the institution of the land grant school made possible high payoff research in the agricultural and mechanical arts when these areas were not found sufficiently "pure" by the traditional university community, but no such arrangements in support of education exist. Schools of education are often the "poor cousins" of academia and scholars in related disciplines who find work in education interesting and challenging are likely to be ostracized by their colleagues. In their attempt to combat this attitude, educational researchers are likely to stress "pure" or theoretically oriented studies to the neglect of the pressing problems of the practitioner.

Thus a decision to base educational research in a university, as opposed to some other setting such as an educational laboratory, a state department of education, or even a local school system must weigh the advantages of available talented manpower, detachment, psychological rewards, and institutional support higher than the disadvantages of institutional ostracism and lack of attention to practical problems.

3. Individual direction. While research efforts in many other segments of American society (e.g., space, atomic energy, cancer and other medical problems) have managed to utilize research teams in a most effective way, research in education has not utilized the team approach to any significant extent. Educational research remains almost entirely an individual effort, even when conducted in the setting of a research bureau or institute.

The individual approach has certain advantages in that researchers are free to pursue that which concerns them most deeply and to which they are most committed. Highly motivated individual researchers can and often do undergo deprivations and make sacrifices which a team of researchers might not tolerate, in order to achieve a breakthrough. Further, the programmatic constraints which inevitably impinge upon the members of a research team cannot act to stifle the creativity of the individual researcher.

A nearly complete reliance on individualistic research does have some serious weaknesses, however. The most severe of these is that the individual is often unable to meet the challenges that confront him because of their sheer size and complexity. Individualistic, uncoordinated attacks on such major problems are usually both inefficient and ineffective. Moreover a series of individual efforts, even if they lie in a similar area, is not likely to cumulate to anything more than the sum of the parts because of the lack of coordination of research.

Thus in taking polar positions on this dimension one chooses between an approach that takes fullest advantage of the researcher's interests and motivation and allows his creative impulses their fullest reign, and an approach that provides the means, manpower, and direction to mount effective and efficient attacks on major educational problems and knowledge gaps.

4. Theory orientation. Many of the sciences on which the applied discipline of education is based are capable of high level theory development. These theories must be tested and the schools provide a convenient "natural laboratory" for this purpose. Accordingly much so-called educational research (apparently so labelled simply because it uses schools or school children as subjects) actually is concerned with the testing of basic theoretical propositions derived from a "pure" discipline area or field.

There is of course great utility in this approach. Most obviously, the purposes of the related disciplines are well served. Some school-relevant data are available as a by-product. The researcher is not oriented to practical problems and can thus pursue truth wherever it leads him. The objective of the development of new knowledge is diligently pursued. Utilitarian considerations need not enter into decisions about the research.

On the other hand, such a theoretical approach usually has little payoff for the practice of education as it exists. Practice is not sufficiently advanced to take advantage of many of the data that do accrue. Since the foci of these efforts relate to other disciplines, little basic description or definition of the educational enterprise takes place. Thus, educational decisions must be made essentially uninformed by the insights of research.

Further, the issue of theoretical versus practical research has gotten all tangled up with overtones of status and professional prestige. Descriptive research is de-facto prestigeless, while theoretical research enjoys very high status.

Thus one may choose between an approach based upon the well-developed theories of related disciplines, which may have high payoff for the further development of that related discipline, and which enjoys high status, and an approach which is essentially practical and descriptive, which enjoys low status, but which renders information more immediately usable at operational levels in education.

5. Experimentalism. For a variety of reasons the experiment has become firmly entrenched as the form of scientific inquiry to be used in education. Obviously it is the experimental approach which has resulted in such fantastic advances in the physical sciences, and any method which is so successful obviously has a great deal to recommend it. The rationale and assumptions underlying experimental design have been well explicated, and a wide variety of research tools based on this rationale are available. Finally, the experiment makes it possible to focus intensively on a few variables to the exclusion of others and to produce data of high internal validity about those variables. Experimentalism is thus well suited to a theory-oriented research community.

There are, however, some major disadvantages to the single-minded use of this technique. First, not all questions are amenable to answer by this method, particularly questions requiring essentially descriptive responses. Second, there is a real question about the generalizability of experimental results to anything other than further experimental situations. The interventions of the experimenter invariably introduce a kind of laboratory bias that make dubious the applicability of results in non-context free situations such as the real world of education. The real forte of the laboratory approach is in producing content free environments. Finally, and perhaps most importantly, the assumptions underlying the application of experimental design simply do not fit the educational milieu. Requirements such as random selection of samples, essential invariance in treatment, screening out of all possible confounding effects (e.g., the introduction of a second innovation while a first is being evaluated), and stability throughout the experimental period are almost impossible of fulfillment in the school situation.

Thus the polar choice is between experimental techniques which are known to be powerful in other inquiry areas, which are well explicated and available, and which have high internal validity, but which have questionable external validity, which cannot respond to the full range of questions being asked, and which are based on assumptions which largely cannot be met in the educational situation; and other non-experimental techniques which may be more appropriate to education, have higher generalizability, but which remain largely unexplicated and unavailable.

6. Psycho-statistical tradition. Most of the active educational researchers in the United States have been trained in a psycho-statistical tradition that places emphasis on educational psychology, measurement theory, and statistics. The large majority of training programs currently being funded under Title IV of the Elementary and Secondary Education Act of 1965 are cast in this same tradition.

This uniformity leads to ease of communication within the research community since most of the members have comparable backgrounds and interest and all understand the jargon and the methods used by their fellow researchers. It is relatively easy to reproduce new members having the same experimental and theoretical orientations as their mentors. In general, research is afforded a cohesiveness and focus by this means that would be hard to achieve in other ways.

On the other hand, the general agreement upon one tradition obviously serves to exclude other possible traditions. Problem areas and methods that do not fit into the prevailing orientation receive little serious attention. Skills appropriate to these other areas will neither be developed nor transmitted. New research roles will not be developed.

Thus, one may choose to follow the psycho-statistical tradition which will produce personnel fitting in well with the research culture and competent to work upon the questions seen as most appropriate within that culture. The choice of some other pattern may produce persons who do not fit in well with either the prevailing conceptual or status structures, but who may be competent to deal with problems and knowledge gaps that lie outside the traditional framework.

7. Part-time nature. Very few educational researchers are able to devote a substantial portion of their time to research efforts. A proportion of active research time as high as one-third is rare. Since most researchers are university based they are required to devote much of their time to other university business, primarily teaching.

There is much to be said for this approach. Some of the leading universities in the country have, as a matter of policy, endeavored to maintain a one-third time commitment to research as the standard. The reasons usually cited are these: students benefit greatly from being exposed to the thinking of "cutting edge" researchers; the researcher benefits from the necessity for organizing his thinking into teachable form; a one-third time commitment to research is about all that any professional can comfortably handle; researchers need time away from their research efforts in order to rejuvenate themselves and to permit unconscious conceptualization (incubation) to occur which will move them to their next breakthrough idea.

But the part-time system also has some obvious weaknesses. It is very difficult for researchers to maintain conceptual continuity and sustained effort under conditions of continuous distraction. The difficulty of serving two masters simultaneously is well known. Often researchers come to view research as an avocation, opting for teaching as a major function; or they may see research as the major function and teaching as an unnecessary imposition. Obviously neither of these views is maximally supportive of either research or teaching.

The choice along this dimension then is between a part-time effort that exposes the researcher to other salutary influences while also resting and rejuvenating him, even though not focussing his full effort on research; and a full-time effort which makes possible sustained and focussed effort but possibly at the expense of fatigue, loss of power, and loss of contact with potentially supportive and sustaining groups.

8. Federal funding. Most of the funds supporting educational research in the United States are supplied by the federal government. The proportion of the total expenditure on research supplied by foundations, other governmental units, and by local school districts is very low.

Federal funding is desirable for a number of reasons. In the first place, most educational problems are found throughout the nation. It would not make sense for every educational sub-unit to study these problems independently, each with its own resources. The available tax base is hardly broad enough to permit such a drain. The federal government can assess the total educational system and allocate resources accordingly to achieve maximum efficiency. Finally, the problem of the local researcher seeking funds in support of his work is vastly eased if the major source of help is single and nationally visible.

There are also obvious problems. Chief among these is the ever-present specter of federal control. To avoid the possibility of such a charge the federal government in the United States has relied heavily upon an extramural program under which research proposals are solicited and recommendations (although not final approval) among the proposals are made by non-governmental field readers. Even under such a system, however, the government does in fact exercise a great deal of control. Such control exists, if for no other reason, because federal support is granted only within certain defined program areas. More recently, as the pressure from the Congress to do something about the practical problems of education has mounted, direct federal solicitation of proposals in areas of great need has become more and more common. Many researchers have been quite willing to produce whatever the government calls for.

Because of the great concern held by many American educators about the possibility of federal control, benefits that could be provided by a strong, centralized agency are not provided by the system. Coordinated funding of research does not occur frequently, and as a consequence, much of the federal contribution to research is used inefficiently and ineffectively. There is high interest in the Congress for obtaining meaningful payoff to educational practice from educational research. But the federal government, despite its control of the purse-strings, has not been able to provide the necessary linkages between research and practice.

The decision for or against federal funding is thus quite muddled. Federal funding presumably might mean a well-coordinated national attack on problems of country-wide significance, with efficient allocation of funds, and simple mechanisms to get the funds into the hands of the researcher. Well-founded concern over the possibility of unwise federal control largely aborts these possibilities however, and leads instead to a system which has been unable to effect planned educational improvement.

Some Consequences for Educational Change in the U. S.

The research enterprise in the United States has developed, whether by intent or accident, along the lines described above: it is a loosely organized, university based, individually directed, theory oriented, experimentally committed, psycho-statistical, part time, federally funded, but understaffed and underfunded activity. There is much to be said for this particular pattern; American educational research is certainly among the vanguard in scope, creativity, flexibility, rigor, excitement, and support. But when the question is raised whether an optimal contribution from research to practice exists, it is apparent that the pattern of American educational research poses particular problems that have prevented research from being a viable partner in the task of planned educational improvement. Specifically, the following four situations give some cause for concern:

1. There is little utilization of research by practitioners. No doubt some of the causes for this low utilization rate reside with the practitioner, but others stem directly from the research community itself. It is the latter causes which are of interest here.

First, research has not been cumulative to any marked degree. Topics which are selected for study in an uncoordinated way by individual researchers are not likely to build upon one another. Thus the practitioner who would like to turn to research for help is likely to confront either a paucity of data in the area of interest to him, or to find competing or conflicting data which leave him in an equivocal position. If he wishes to know, for example, what research says about the ideal size of a school, he is able to find data in support of almost any position he may wish to take. If he wishes to find out whether homogeneous or heterogeneous grouping is the more desirable, he can find as many studies supporting one view as the other.

Second, research has not been *programmatically oriented*, so that major problem areas have not been systematically explored. Because of the existing funding patterns, the individual direction, and the part-time endeavor aspect, it has been difficult to achieve any pattern other than *ad hoc* project research. This approach forces the development of proposals which are easily manageable, which are capable of achievement in a short time with a relatively small staff, and which are simple enough so that a definite product can be described and delivery promised. Project research militates heavily against the conduct of longitudinal studies, general descriptive ventures, or inquiries of broad scope. Researchers who wish to attack major problems must attempt to string together a series of inter-related small projects. Heuristic studies intended to open an area of inquiry must be eschewed. Finally, the efficiency of the individual investigator is sharply reduced because of his need to develop multiple proposals and to be on the lookout continuously for possible funding sources for them. None of these circumstances is conducive to mounting the kinds of inquiries now most needed in education. Great gaps in existing knowledge are the result.

Third, the research currently being produced has been quite *unresponsive to practical problems*. Researchers tend to focus on problems with a theoretical orientation, amenable to experimental methods, and consistent with the psycho-statistical tradition with which they have been imbued. Researchers publish for other researchers. Their contributions are typically not understandable to the practitioner, who is, by contrast, a layman. There are no formal feedback loops through which practical problems can be brought to the attention of researchers. For these reasons the practitioner is quickly convinced that research products are simply not applicable to the real world as he knows it.

2. There are no adequate mechanisms to link the worlds of the researcher and the practitioner. Until a few years ago it was commonly assumed by practitioners that the development function was properly placed within the purview of the researcher, while the researcher felt that it was up to the practitioner to make practical applications from research. Acrimonious debate raged between the two camps, with both sides failing to realize that neither of them was especially competent to carry out this function. The concept that whole new specializations, both individuals and agencies, are required to carry out development efforts is of very recent origin indeed.

Experience gleaned by industry indicates that from five to eleven times as much investment is required to develop a practical application from a basic research finding than was necessary to produce the basic idea in the first place. Highly specialized personnel (engineers) are needed to carry out the necessary steps. Moreover, development depends not only upon the availability of relevant basic research but upon a host of other factors as well: the availability of resources, institutional support, experiential lore, political factors, analysis of the nature of the ultimate consumer, and others. Hence research data provide only one of several critical inputs in developmental activity, and the practical blending of all of these inputs requires more specialized skill than either researchers or practitioners commonly possess.

It is an interesting conjecture why specialization has not occurred among researchers to fulfill some of these development functions. In part we may account for this fact by pointing to the generally low status enjoyed by any practically oriented activity in education. The university location, theoretical orientation, experimental commitment, and part-time character of the research community have also militated against such a tendency. And, of course, the short supply of both personnel and funds has dictated a policy of emphasis upon central rather than peripheral matters. Clearly the researcher regards the production of new knowledge as more central than the development of practical applications.

3. Patterns for training educational researchers or for producing needed new middlemen (linkers) are inadequate or non-existent. The psycho-statistical tradition of educational research militates heavily against the development of researchers in any other mold, and particularly militates against the training of new middlemen role incumbents.

Typical training programs in research have many gaps. Well over 90 per cent of the training programs for researchers currently being supported under Title IV of the Elementary and Secondary Education Act conform to traditional patterns. The trainee with an interest in practical problems or with a non-statistical or non-experimental orientation has little hope of finding a program suited to him. This is true despite the fact that practicing researchers are increasingly being asked to perform functions that they have not been trained to handle. For example, researchers are engaging in field research activities which are quite different from the traditional laboratory research skills provided by most training program activities. Researchers are being asked to create "quality control" programs and designs for "process" or "context" evaluation, but experience with classical experimental designs do not equip them to meet these demands.

Training for the new middlemen linking roles--educational developers, engineers, evaluators, diffusers, demonstrators, and the like--is almost non-existent. While the demand for such personnel is sharply on the rise (Clark and Hopkins (1967) estimate that some 45,000 full time equivalents will be needed by 1972 simply to staff the federally and foundation supported programs that will then be in existence), present training institutions continue to be unresponsive to the need. To some extent this failure can be charged to the fact that not enough is known about the role requirements to project a training program for them. But it is obviously also true that response has been slow because these new roles do not conform to the traditional research image nor to the interests of the universities in which much of the training will have to take place.

4. Adequate tools and strategies for carrying out school improvement activities are lacking. The practical problems related to school improvement have not received the full attention of researchers because of their predilection for theory and experiment, because of the training

to which they have been subjected, and because of the general lack of interest within universities toward such problems. As a result the needed tools and strategies for investigating, and otherwise coping with, these problems remain at a primitive level.

We may illustrate this point with two examples. First, as has been pointed out, the major methodological research tools are firmly based in the theory of experimental design, but this theory is largely inappropriate to education because educational activities cannot be caused to conform to the assumptions underlying the experimental method. The typical reaction of the research community has been to decry this fact, citing the impossibility of doing rigorous research in field settings because of the apparent lack of cooperation of school and other educational personnel. But it is obviously equally possible to decry the unwillingness of the researcher to turn his attention to the development of new, non-experimental designs which rest upon assumptions more suited to education in the field. Such new designs are lacking, and adequate research in the real world of education awaits their development.

Second, we may turn to the problem of adoption of educational improvements. Adequate adoption strategies must obviously be based upon data about the educational setting: the training factors, the organizational factors, the physical factors (plant, etc.) that play a major role in determining whether an adopted practice becomes institutionalized or drops by the wayside. Such data are largely lacking now because of the disinterest of the research community in studying these factors in any systematic way. Strategies must therefore be developed largely on the basis of practitioner experience and expert judgment. While such strategies are likely to be reasonably successful, one can only wonder how much more effective they might be if they were adequately informed by educational research.

Some Alternative Avenues for Redevelopment

If there are certain conditions which prevent research from influencing practice in an optimal way, it is appropriate to inquire what might be done to eliminate or alleviate these conditions. Several alternatives will be commented upon briefly.

1. Redesign the existing research structure. Obviously one way to improve the situation would be to redesign the existing research structure, i.e. to make some other pattern of choices along the eight or more characteristic dimensions which would result in a different overall structure. This is probably not a very feasible general strategy. For example, it seems unlikely that research could be successfully moved out of the university into some other setting; indeed, the advantages that accrue to research as a result of being university based are so great that such a move would probably be unwarranted. It is also unlikely that a strong central organization for research could emerge unless the federal government played a most active role, but the frequently expressed fears of federal control probably contraindicate such a move,

At the same time it is clear that certain of the dimensions could be re-examined and possibly altered in some aspects. It is probably true that either-or decisions need not be made for most characteristics; thus research need not be entirely theory oriented or practice oriented, or entirely experimental or non-experimental; intermediate positions are possible. Universities and other existing research agencies could very profitably engage in some examination of their positions on these continua, making adjustments as may seem warranted to retain as many of the present advantages while ameliorating as many as possible of the disadvantages.

2. Develop new research structures to complement existing structures. This is the strategy being followed by the U. S. Office of Education as it develops new research and development centers, regional educational laboratories, and certain Title III activities. In these ventures the characteristic loose organization is somewhat tightened, some research is contemplated in non-university settings, programmatic team efforts tend to replace individual direction, effect on practice is made one of the major criteria for judging the success of the research, and personnel are assigned to research on a full-time basis. These programs are as yet too new to make it possible to judge their success in overcoming noted deficiencies, but the strategy seems reasonable on its face. Unfortunately, the expectations for research from these new agencies is fairly limited except in the case of the research and development centers, which approximate the traditional patterns most closely. Early experience with these agencies indicates, as one might expect, that their major problems have to do with the selection of a

programmatic focus, gaining commitment from staff to make significant contributions to the agency selected program, getting researchers to work on teams, and opening contacts with the practitioner community.

3. Build linking mechanisms to relate the research community to the practitioner community. This strategy is also being vigorously pursued in the establishment of the new research and development centers, the regional laboratories, and Title III programs. The ideal that is often held up (although by no means achieved in practice) is that the research and development centers shall engage in more practically oriented research than has been the case, that the regional educational laboratories shall convert this research into developed and tested applications, and that the Title III projects shall disseminate information about these new applications, perhaps even assisting schools to adopt them. Since these three programs are not coordinated, however, there is some doubt whether such a division of functions will in fact emerge. In many cases the personnel attached to each of these three programs seem unconvinced of the wisdom of such a division. Again only time will tell.

Another development related to this linking strategy is the establishment of the ERIC program (Educational Research Information Centers), which is intended to make possible instantaneous retrieval of research findings for practical applications. To date the program seems to have functioned mainly to make information about research accessible to other researchers; little attention has been given to the special information requirements of the practitioner or developer. Presumably accumulated experience will make the necessary further refinements possible.

4. Build new training programs. The greatest potential for moving research into new directions may well result from an investment in new training programs. These programs could contain many elements not found in existing training situations. They could also, and perhaps most importantly, work to develop new attitudinal factors, e.g., according respectability to practical research efforts, recognizing the legitimacy and utility of non-theoretical studies, etc.

A step in this direction appeared to be taken with the establishment, under Title IV of ESEA, of undergraduate programs in research, of pre- and post-doctoral research fellowships and institutes, and of program development activities. Unfortunately, the program has not been supported at the level initially projected. For all practical purposes the undergraduate programs have been entirely eliminated and the remaining programs have been maintained only at their first year levels. Those programs which have, in fact, been supported have tended to follow traditional research training patterns so that the hoped-for breakthroughs have not had a chance to occur. Clearly the goals which the program was intended to achieve have not been realized, nor will they be unless program administration policies are sharply altered.

Conclusion

Section VI has attempted to interpret the descriptive data of the first five sections in relation to educational improvement. The educational research enterprise of the United States was characterized along ten dimensions, eight of which had certain advantages and disadvantages which were enumerated. The particular patterns of choices within these dimensions that characterizes American educational research is obviously quite useful. However, it was pointed out that this pattern leads to four major deficiencies in relation to the role of research in informing and providing a knowledge base for educational improvement. These four deficiencies are (1) lack of research information utilization, (2) lack of adequate research to practice linking mechanisms, (3) lack of adequate research training programs, and (4) lack of adequate tools and strategies for implementing improvement programs. Four strategies for ameliorating these deficiencies were outlined and a status report was presented indicating the impact of each strategy on contemporary American education. Clearly, relevant strategies are being pursued but only time (or research?) will tell whether they are successful.

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